Multi-Hazard Mitigation Plan

Saline *County, IL*

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Saline County, Illinois

Adoption Date: -- ______________________ --

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Section 1 Introduction

Hazard mitigation is defined as any sustained action to reduce or eliminate long-term risk to human life and property from hazards. The Federal Emergency Management Agency (FEMA) has made reducing hazards one of its primary goals; hazard mitigation planning and the subsequent implementation of resulting projects, measures, and policies is a primary mechanism in achieving FEMA's goal.

The Multi-Hazard Mitigation Plan (MHMP) is a requirement of the Federal Disaster Mitigation Act of 2000 (DMA 2000). The development of a local government plan is required in order to maintain eligibility for certain federal disaster assistance and hazard mitigation funding programs. In order for the National Flood Insurance Program (NFIP) communities to be eligible for future mitigation funds, they must adopt an MHMP.

In recognition of the importance of planning in mitigation activities, FEMA created **Haz**ards **US**A **M**ulti-**H**azard (Hazus-MH), a powerful geographic information system (GIS)-based disaster risk assessment tool. This tool enables communities of all sizes to predict estimated losses from floods, hurricanes, earthquakes, and other related phenomena and to measure the impact of various mitigation practices that might help reduce those losses. Southern Illinois University at Carbondale (SIUC) and The Polis Center (Polis) at Indiana University - Purdue University Indianapolis (IUPUI) are assisting Saline County with performing the hazard risk assessment.

Section 2 Planning Process

2.1 Timeline

The MHMP process is broken into a series of five meetings. These meetings are organized by SIUC and hosted by the Saline County Emergency Management Agency. At these five meetings, various tasks are completed by SIUC and/or Polis and the county planning team:

> **Meeting 1:** The purpose of Meeting 1 is to introduce the MHMP process and organize resources. SIUC gathers local resources which contribute to the detailed county risk assessment.
>
> **Meeting 2:** SIUC presents the county's historical hazards. Based on this information, the planning team identifies natural hazards to include in the plan, and ranks hazards by potential damages and occurrences. The planning team also provides SIUC with disaster scenarios for the county risk assessment.
>
> **Meeting 3:** At this meeting, SIUC and Polis present the draft risk assessment, derived from the Hazus-MH and GIS modeling of the identified disasters, to the planning team. The general public is also invited to this meeting through a series of newspaper articles and/or radio spots. At the end of the meeting, the general public is encouraged to ask questions and provide input to the planning process, fulfilling one of FEMA's requirements for public input.

Meeting 4: This meeting consists of a “brainstorming session.” The planning team lends local knowledge to identify and prioritize mitigation strategies and projects that can address the threats identified in the risk assessment. It is required that the plan contain strategies specific to each hazard and for each incorporated area within the county.

Meeting 5: At this meeting, the planning team reviews the draft plan, proposes revisions, and accepts the plan after the necessary changes are incorporated. Subsequently, SIUC will forward the county MHMP to the mitigation staff at the Illinois Emergency Management Agency for review prior to submitting to FEMA.

2.2 Planning Team Information

The Saline County Multi-Hazard Mitigation Planning Team is headed by Allan Ninness. Members of the planning team include representatives from various county departments, cities and towns, and public and private utilities. Table 2-1 identifies the planning team individuals and the organizations they represent.

Table 2-1: Mitigation Planning Team Members

Name	Title	Organization	Jurisdiction
Allan Ninness	Director	Saline County EMA	Saline County
Jeff Jones	County Engineer	Saline County Highway Dept.	Saline County
Ron Fearheily	Councilman	Harrisburg City Council	City of Harrisburg
Bill Summers	Fire Chief	Harrisburg Fire Department	City of Harrisburg
Rick Mallody	EMA Coordinator	Harrisburg EMA	City of Harrisburg
Mike Mckinnies			City of Eldorado
Geoff Absher			Village of Carrier Mills
Chad Lambart			Village of Galatia
John Molinarolo			Village of Muddy
James Agin			Village of Raleigh
Ron Howard	Trustee	Village of Stonefort	Village of Stonefort

The DMA 2000 planning regulations stress that planning team members from each jurisdiction be active participants in the MHMP process. The Saline County mitigation planning team members were actively involved on the following components:

- Attending the MHMP meetings
- Providing available GIS data and historical hazard information
- Reviewing and providing comments on the draft plans
- Coordinating and participating in the public input process
- Coordinating the formal adoption of the plan by the county

A MHMP kickoff meeting was held at Southeastern Illinois College on August 8, 2011. Representatives from SIUC and Polis Center explained the rationale behind the MHMP program and answered questions from the participants. SIUC representatives provided an overview of Hazus-MH, described the timeline and the process of the mitigation planning project, and presented Saline County with a Memorandum of Understanding (MOU) for sharing data and information.

The Saline County Multi-Hazard Mitigation Planning Committee met on August 8, September 19, January 17, 2012, February 21, 2012 and <date>. Each meeting was approximately two hours in length. The meeting minutes are included in Appendix A. During these meetings, the planning team successfully identified critical facilities, reviewed hazard data and maps, identified and assessed the effectiveness of existing mitigation measures, established mitigation projects, and assisted with preparation of the public participation information.

2.3 Public Involvement

An effort was made to solicit public input during the planning process, and a public meeting (Meeting #3) was held on January 17, 2012 to review the county's risk assessment. Appendix A contains the minutes from the public meeting. Appendix B contains press releases sent to local newspaper throughout the public input process.

2.4 Neighboring Community Involvement

The Saline County planning team invited participation from various representatives of county government, local city and town governments, community groups, local businesses, and universities. The team also invited participation from adjacent counties to obtain their involvement in the planning process. Details of neighboring stakeholders' involvement are summarized in Table 2-2.

Table 2-2: Neighboring Community Participation

Person Participating	Neighboring Jurisdiction	Title/Organization	Participation Description
Steve Land	Williamson County	EMA & LEPC	Reviewed plan; offered comments
Ryan Buckingham	Franklin County	EMA	Reviewed plan; offered comments
William Sandusky	Hamilton County	EMA	Reviewed plan; offered comments
Steve Galt	Gallatin County	EMA	Reviewed plan; offered comments
James Kevin Carman	Hardin County	EMA	Reviewed plan; offered comments
Chris Hahn	Pope County	EMA	Reviewed plan; offered comments

2.5 Review of Technical and Fiscal Resources

The mitigation planning team has identified representatives from key agencies to assist in the planning process. Technical data, reports, and studies were obtained from these agencies. The organizations and their contributions are summarized in Table 2-3.

Table 2-3: Key Agency Resources Provided

Agency Name	Resources Provided
Illinois Environmental Protection Agency	Illinois 2008 Section 303(d) Listed Waters and watershed maps
U.S. Census	County Profile Information, e.g., Population and Physical Characteristics
Department of Commerce and Economic Opportunity	Community Profiles
Illinois Department of Employment Security	Industrial Employment by Sector
NOAA National Climatic Data Center	Climate Data
Illinois Emergency Management Agency	2010 Illinois Natural Hazard Mitigation Plan
Illinois Water Survey (State Climatologist Office)	Climate Data
Headwaters Economics & The Bureau of Land Management	A Socioeconomic Profile – Saline County, IL
Saline County Emergency Management Office	Saline County Emergency Operation Plan, Nov. 2010

2.6 Review of Existing Plans

Saline County and its local communities utilized a variety of planning documents to direct community development. These documents include land use plans, comprehensive plans, emergency response plans, municipal ordinances, and building codes. The planning process also incorporated the existing natural hazard mitigation elements from previous planning efforts. Table 2-4 lists the plans, studies, reports, and ordinances used in the development of the plan.

Table 2-4: Planning Documents Used for MHMP Planning Processes

Author(s)	Year	Title	Description	Where Used
FEMA	2011	Saline County Flood Insurance Study	Describes the NFIP program, which communities participates; provide flood maps	Sections 4 and 5
Supervisor of Assessments	2011	GIS Database	Parcel and Assessor Data For Saline County.	Section 4
State of Illinois Emergency Management Agency	2010	2010 Illinois Natural Hazard Mitigation Plan	This plan provides an overview of the process for identifying and mitigating natural hazards in Illinois as require by the Disaster Mitigation Act of 2000.	Guidance on hazards and mitigation measures and background on historical disasters in Illinois.

2.7 Jurisdiction Participation information

It is intended that this plan meet the requirements of the DMA 2000 and that each incorporated jurisdiction adopt it. The incorporated communities included in this multi-jurisdictional plan are listed in Table 2-5. The incorporated community of Stonefort, which is located partially in Williamson County and partially in Saline County, has chosen not to participate in this plan because they participated in the Williamson County plan, which was completed in 2008.

Table 2-5: Participating Jurisdictions

Jurisdiction Name
Saline County
City of Harrisburg
City of Eldorado
Village of Carrier Mills
Village of Galatia
Village of Muddy
Village of Raleigh
Village of Stonefort

2.8 Adoption by Local Governing Body

The draft plan was made available on January 17, 2012 to the planning team for review. Comments were then accepted. The Saline County hazard mitigation planning team presented and recommended the plan to the County Commissioners, who adopted it on <date adopted>. Resolution adoptions are included in Appendix C of this plan.

2.9 Jurisdiction Participation

It is required that each jurisdiction participate in the planning process. Table 2-2 lists each jurisdiction and describes its participation in the construction of this plan.

Table 2-6: Participating Jurisdictions

Jurisdiction Name	Participating Member	Participation Description
City of Harrisburg	Rick Mallady	Attended Meetings/Reviewed Plans
City of Eldorado	Mike McKinnies	Attended Meetings/Reviewed Plans
Village of Galatia	Chad Lambert	Attended Meetings/Reviewed Plans
Village of Muddy	John Molinarolo	Attended Meetings/Reviewed Plans
Village of Raleigh	James Agin	Attended Meetings/Reviewed Plans
Village of Stonefort	Ron Howard	Attended Meetings/Reviewed Plans
Saline County	Allan Ninness	Attended Meetings/Reviewed Plans

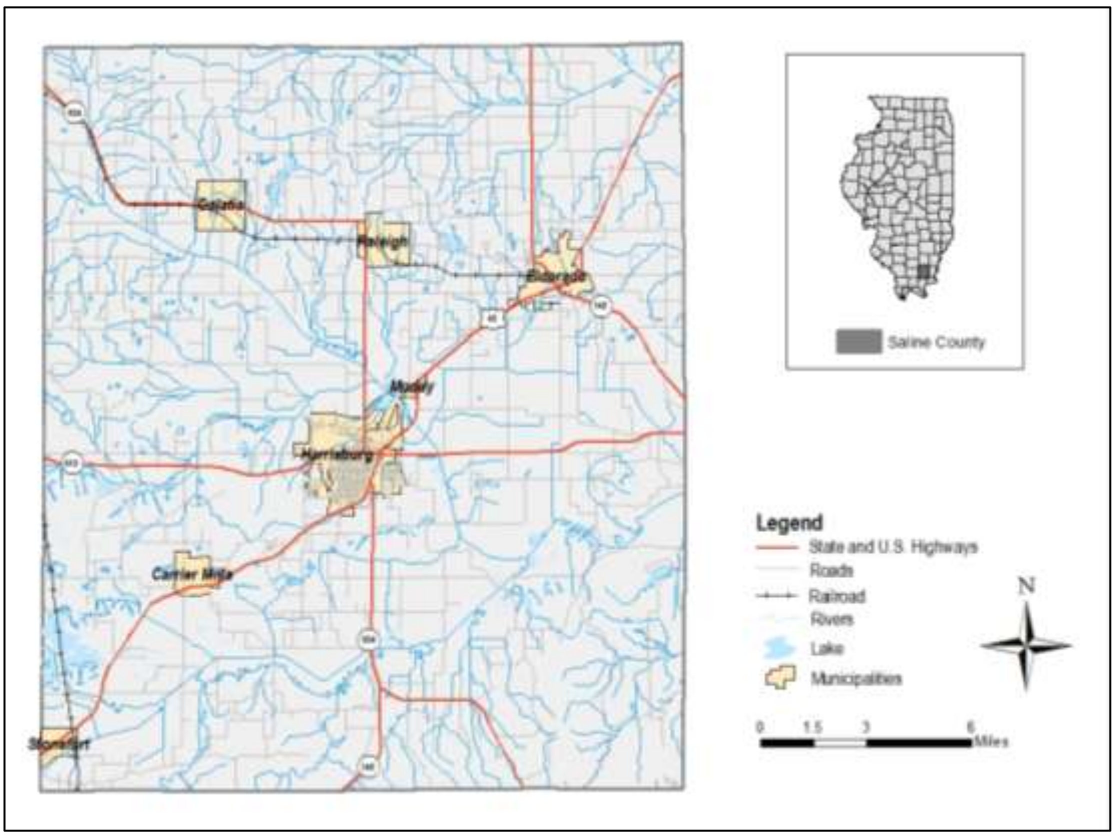
All members of the mitigation planning team were actively involved in attending the MHMP meetings, providing available Geographic Information Systems (GIS) data and historical hazard information, reviewing and providing comments on the draft plans, coordinating and participating in the public input process, and coordinating the county's formal adoption of the plan.

Section 3 County Profile

3.1 County Background

Saline County is located in southeastern Illinois. Saline County was named after Saline Creek. The county has seven municipalities: Harrisburg, Carrier Mills, Eldorado, Galatia, Muddy, Raleigh, and Stonefort. The largest city and county seat of Saline County is Harrisburg. The major transportation route is U.S. Route 45 (running from northeast to southwest) and State Highway 13 (running east-west; Figure 3-1).

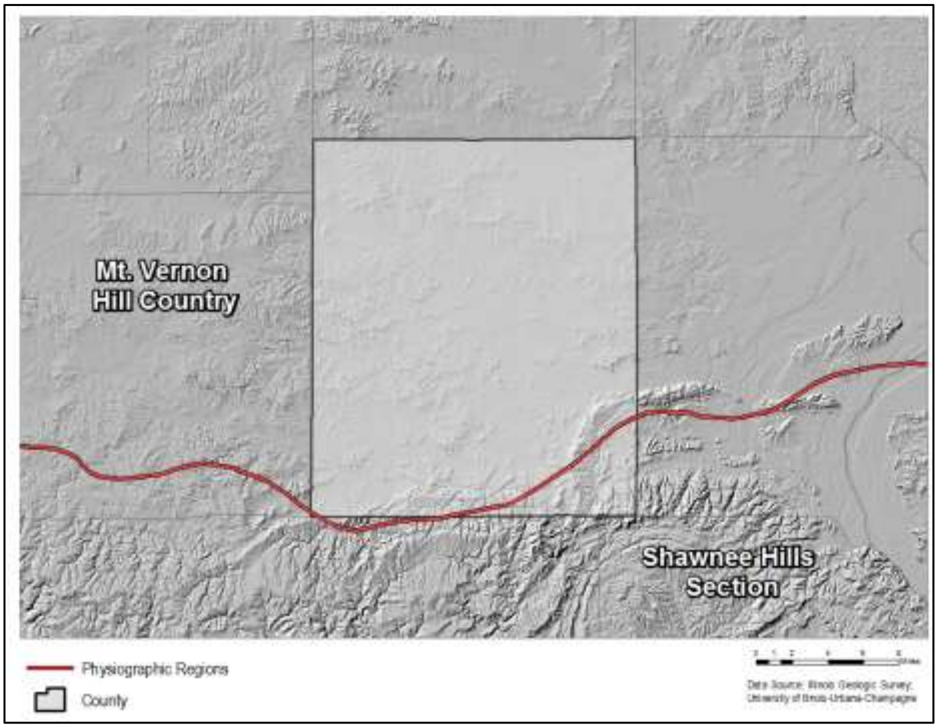
Figure 3-1: Saline County's Geographical Location



3.2 Topography

Saline County is situated in physiographic regions of Mt. Vernon Hill Country and the Shawnee Hills Section. The physiographic regions are seen in Figure 3-2.

Figure 3-2: Physiographic Divisions of Saline County and the Surrounding Region



3.3 Climate

Saline County climate is typical of southern Illinois. The variables of temperature, precipitation, and snowfall can vary greatly from one year to the next. Winter temperatures can fall below freezing starting as early as October and extending as late as April. Based on National Climatic Data Center (NCDC), normal from 1971 to 2000, in winter, on average the lowest winter temperature is 24.2° F and the average high is 45.3° F. In summer, the average low is 63.1° F and average high is 86.8° F. Average annual precipitation is 45.07 inches throughout the year.

Southeastern Illinois is prone to strong thunderstorms that can produce strong winds, lightning, hail, and sometimes tornadoes. Historically, these storms can occur at almost any time throughout the year, but are most common in the spring and summer months.

3.4 Demographics

Saline County has a population of 24,302 (2010 U.S. Census). The population is spread through 13 townships: Brushy, Carrier Mills, Cottage, East Eldorado, Galatia, Harrisburg, Independence, Long Branch, Mountain, Raleigh, Rector, Stonefort, and Tate. The largest community in Saline County is Harrisburg, which has a population of approximately 9,017. The breakdown of population by township is included in Table 3-1. Townships containing incorporated communities are marked with an asterisk (*).

Table 3-1: Population by Township

Township	2010 Population	Percent of County
Brushy	766	3.1%
Carrier Mills	2,322	9.4%
Cottage	219	0.9%
East Eldorado	5,906	23.8%
Galatia	1,230	5.0%
Harrisburg	10,790	43.5%
Indepedence	1118	4.5%
Long Branch	189	0.8%
Mountain	357	1.4%
Raleigh	1,186	4.8%
Rector	81	0.3%
Stonefort	408	1.6%
Tate	256	1.0%

SOURCE: 2010 U.S. CENSUS

3.5 Economy

American FactFinder reported for 2010 that 52.7% of the workforce in Saline County was employed in the civilian labor force. The breakdown is included in Table 3-2. Educational, health and social services represent the largest sector, employing approximately 27.7% of the workforce. The 2010 annual per capita income in Saline County is $21,140.

Table 3-2: Industrial Employment Sector

Industrial Sector	% Distribution in County 2010
Agriculture, forestry, fishing, hunting, and mining	9.1
Construction	8.9
Manufacturing	5.8
Wholesale trade	2.0
Retail trade	11.3
Transportation, warehousing and utilities	3.8

Industrial Sector	% Distribution in County 2010
Information	1.3
Finance, insurance, real estate, and rental/leasing	4.1
Professional, technical services	6.3
Educational, health, and social services	27.7
Arts, entertainment, recreation	6.7
Other services	4.9
Public administration	8.1

3.6 Industry

Saline County's major employers include the American Coal, Harrisburg Medical Center and South Eastern Illinois College. Table 3-3 lists other major employers within Saline County.

Table 3-3: Major Employers in Saline County

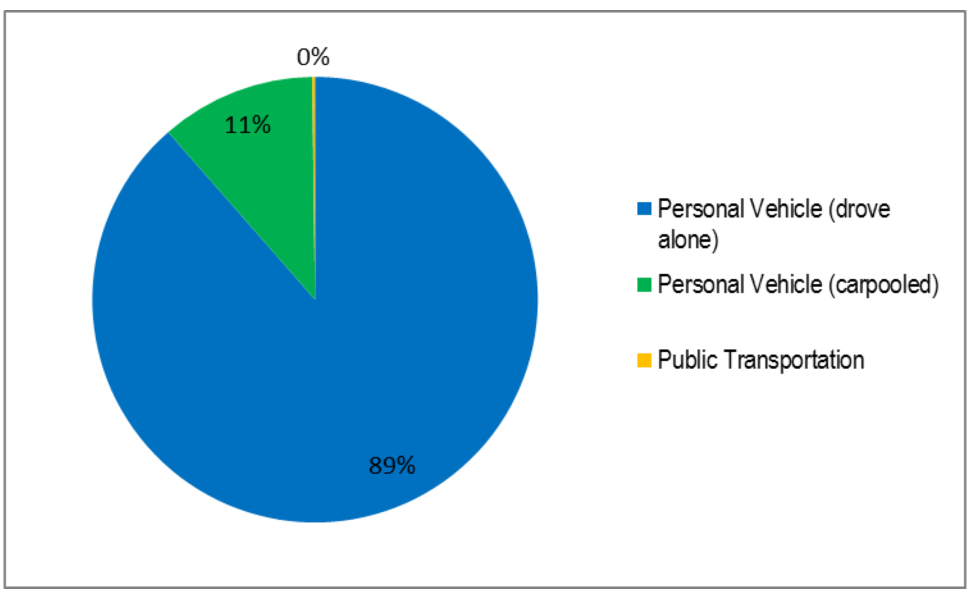
MANUFACTURING				
Company Name	*Jurisdiction*	*Year Established*	*# of Employees*	*Type of Business*
Nation Wide Glove	Harrisburg	1970	50	Equipment Manufacturing
Wallace Auto Parts & Service	Raleigh	1984	30	Equipment Manufacturing
Date Mining Service	Harrisburg	2006	27	Equipment Manufacturing
SCHOOLS				
Company Name	*Jurisdiction*	*Year Established*	*# of Employees*	*Type of Business*
Carrier Mills/Stonefort CUSD	Carrier Mills	1932	50	Education
Eldorado CUSD #4	Eldorado	1968	166	Education
Galatia CUSD	Galatia		39	Education
Harrisburg CUSD	Harrisburg	1861	378	Education
South Eastern Illinois College	Harrisburg	1960	270	Education
HEALTH CARE				
Company Name	*Jurisdiction*	*Year Established*	*# of Employees*	*Type of Business*

Ferrell Hospital	Eldorado	1925	206	Medical Service
Harrisburg Medical Center	Harrisburg		520	Medical Service
Egyptian Health Department	Eldorado	1952	155	Medical Service
Mining				
Company Name	*Jurisdiction*	*Year Established*	*# of Employees*	*Type of Business*
Peabody Coal Company	Eldorado			Coal
American Coal	Galatia	1980	800	Coal
Eagle River	Harrisburg			Coal
Willow Lake	Equality	1984	514	
Wildcat Hills	Equality	2006	211	

3.7 Commuter Patterns

According to American FactFinder information from 2010, approximately 36% of Saline County's population is in the work force. The average travel time from home to work is 22.1 minutes. Figure 3-3 depicts the commuting patterns for Saline County's labor force.

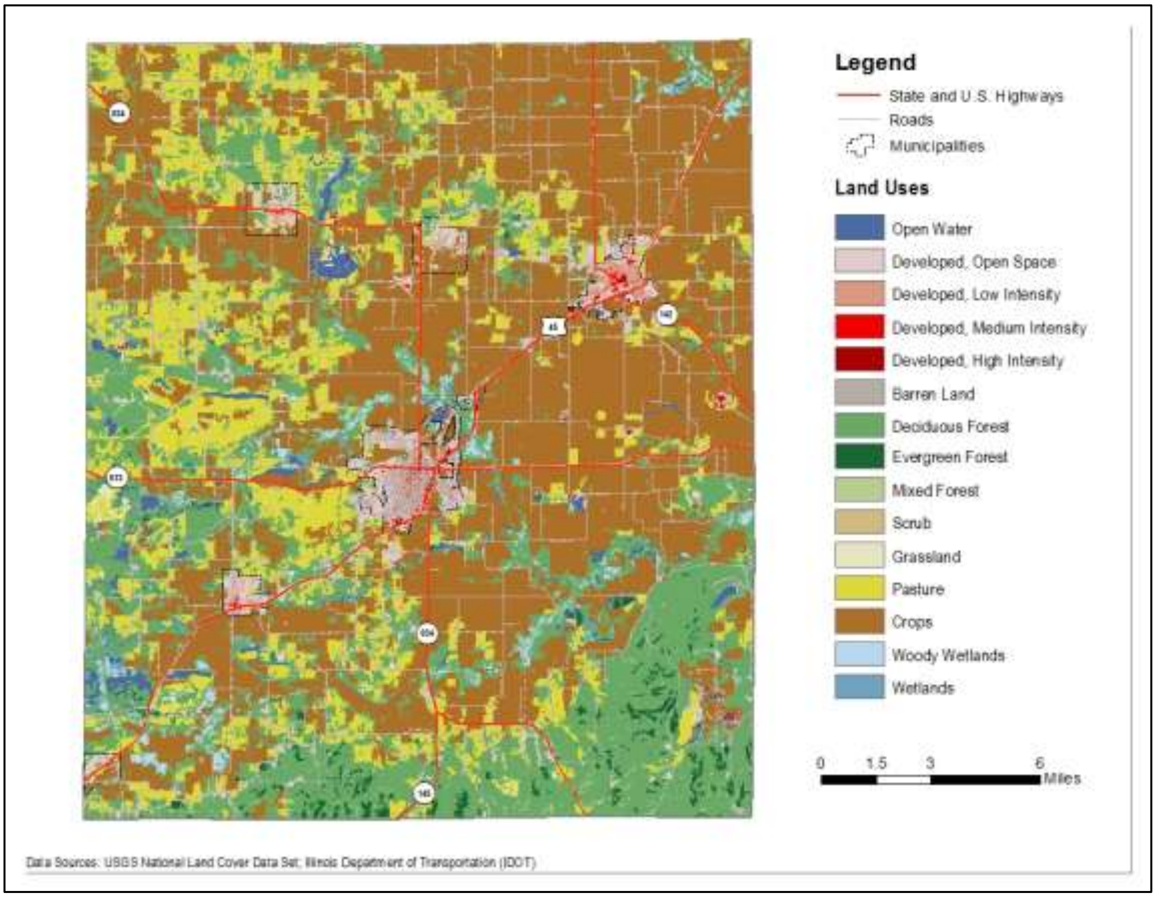
Figure 3-3: Commuter Patterns for Saline County



3.8 Land Use and Development Trends

The predominant land use in Saline County is agriculture and mixed evergreen and deciduous forest. Saline County is one of the gateways to the Shawnee National Forest, including Garden of the Gods, which is a wilderness area containing extraordinary rock formations sculpted by 320 million years of wind and rain. Currently in Saline County, there are no substantial developments taking place and no substantial growth is expected within the next five years.

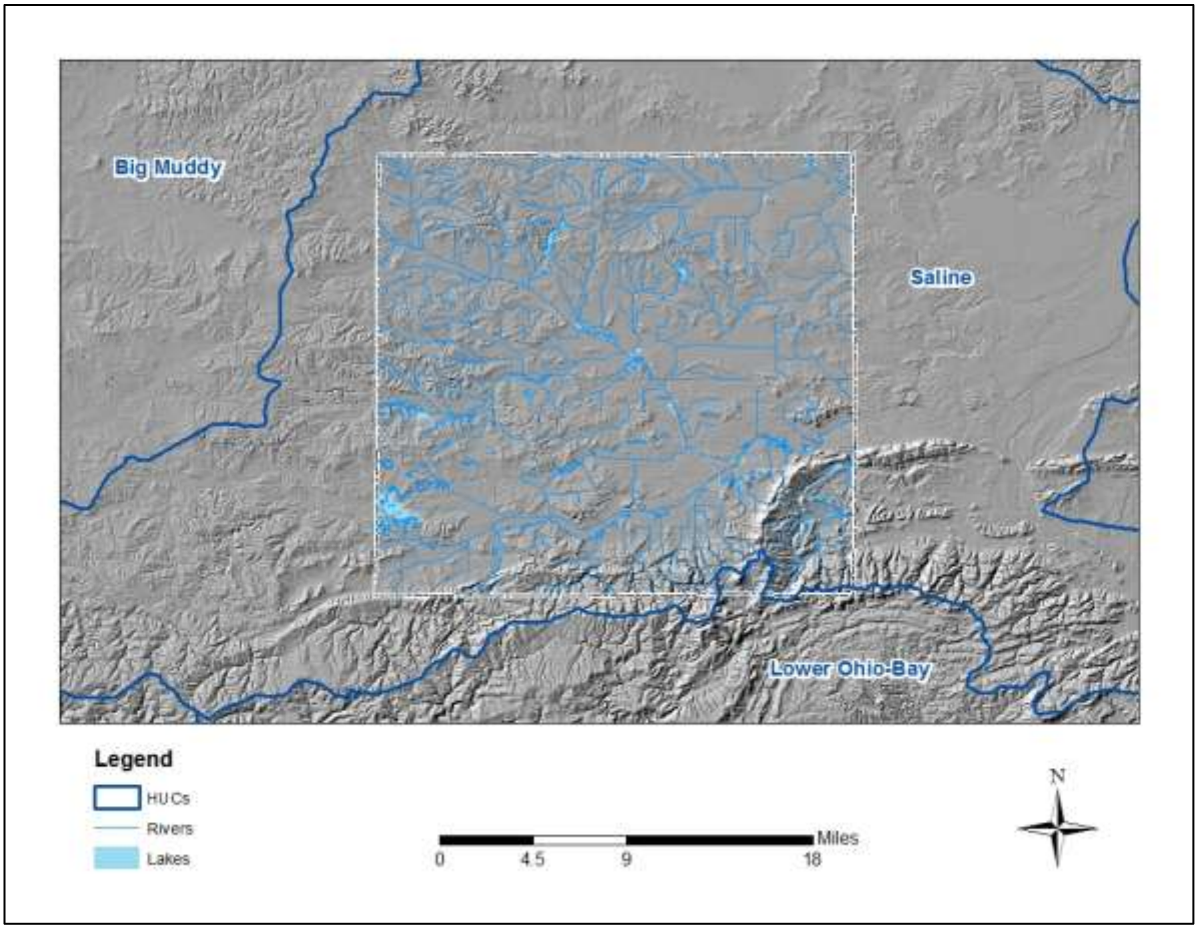
Figure 4: Land Use in Saline County



3.9 Major Lakes, Rivers and Watersheds

Saline County's major body of water is the Saline River. According to the USGS, Saline County lies within two drainage basins: Saline and the Lower-Ohio Bay HUC's. Figure 3-5 depicts the hydrologic units within the County.

Figure 3-5: Major Lakes and Rivers in Saline County



Section 4 Risk Assessment

The goal of mitigation is to reduce future hazard impacts including loss of life, property damage, disruption to local and regional economies, and the expenditure of public and private funds for recovery. Sound mitigation must be based on rigorous risk assessment. A risk assessment involves quantifying the potential loss resulting from a disaster by assessing the vulnerability of buildings, infrastructure, and people. This assessment identifies the characteristics and potential consequences of a disaster; how much of the community could be affected; and the impact on community assets. A risk assessment consists of three components—hazard identification, vulnerability analysis, and risk analysis.

4.1 Hazard Identification

4.1.1 Existing Plans

The plans identified in Table 2-4 did not contain a risk analysis. These local planning documents were reviewed to identify historical hazards and help identify risk. To facilitate the planning process, FEMA Digital Flood Rate Insurance Maps (DFIRMs) and other Federal and State flood data were used for flood analysis.

4.1.2 National Hazard Records

4.1.2.1 National Climatic Data Center (NCDC) Records

To assist the planning team, historical storm event data were compiled from the National Climatic Data Center (NCDC). NCDC records are estimates of damage reported to the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to given weather events.

The NCDC data included 334 reported events in Saline County from 1957-2012 (the most updated information as of the date of this plan). A summary table of events related to each hazard type is included in the hazard profile sections that follow. Full details of individual hazard events are on the NCDC website. In addition to NCDC data, Storm Prediction Center (SPC) data associated with tornadoes, strong winds, and hail were plotted using SPC-recorded latitudes and longitudes. These events are included on the map in Appendix D. The list of NCDC hazards is included in Table 4-1.

Table 4-1: NCDC Historical Hazards

Hazard
Tornadoes
Severe Thunderstorms
Drought/Extreme Heat
Winter Storms
Flood/Flash flood

4.1.2.2 FEMA Disaster Information

Since 1965, FEMA has declared 58 disasters for the State of Illinois as of January 2012. Emergency declarations allow states access to FEMA funds for Public Assistance (PA); disaster declarations allow for even more PA funding including Individual Assistance (IA) and the Hazard Mitigation Grant Program (HMGP). Saline County has received federal aid for six declared disasters since 1965. Figure 4-1 depicts the disasters and emergencies that have been declared for Saline County since 1965. Table 4-2 lists more specific information for each declaration.

Figure 4-1: FEMA-Declared Emergencies and Disasters in Saline County (1965-present)

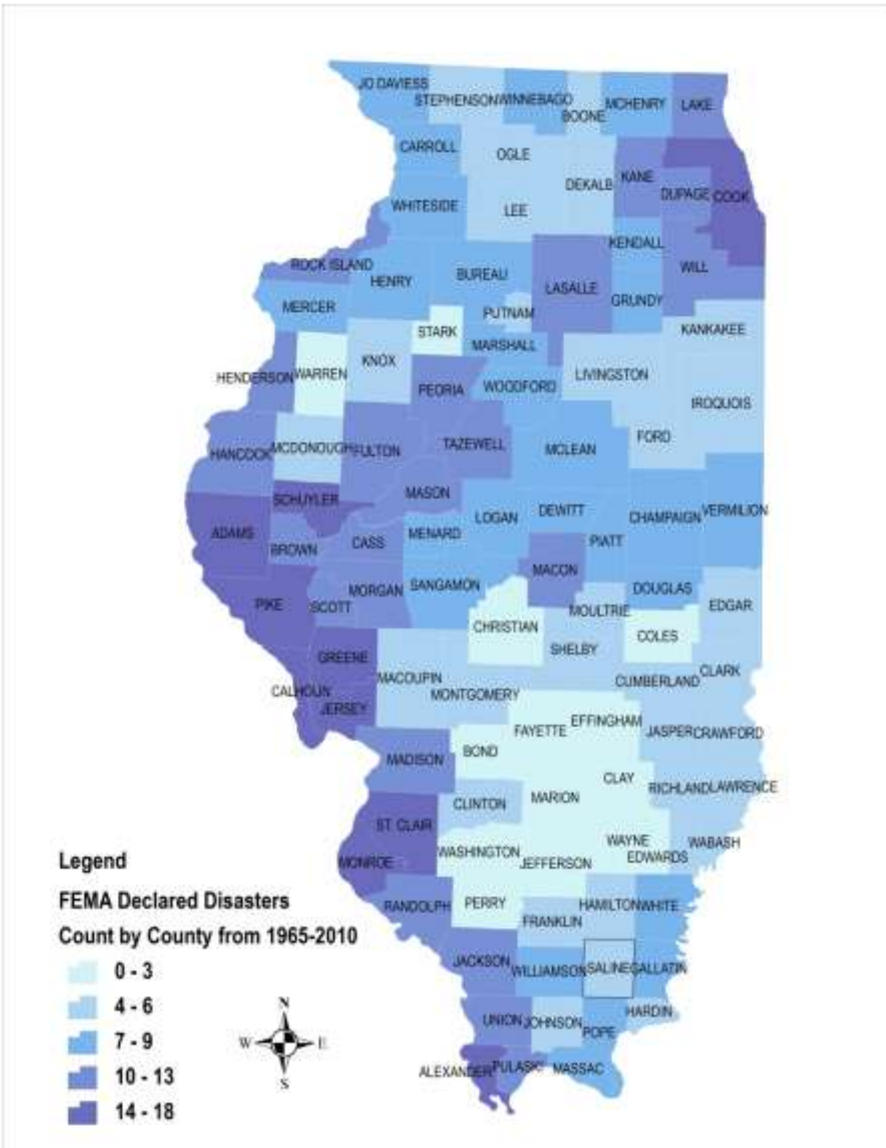


Table 4-2: Details of FEMA-Declared Emergencies and Disasters in Saline County (1965-present)

Date	Declaration Number	Date of Declaration	Description
5/6/1996	1112	5/17/1996	Severe Storms/ Flooding
4/2/2002	1416	4/29/2002	Tornadoes/ Flooding
	3199	2/1/2005	Severe Winter Storm
	1826	3/2/2009	Severe Winter Storms
	1850	7/2/2009	Severe Storms
5/5/2011		6/10/2011	Severe Storms/ Flooding

4.1.3 Hazard Ranking Methodology

Based on planning team input, national datasets, and existing plans, Table 4-3 lists the hazards Saline County will address in this multi-hazard mitigation plan. In addition, these hazards ranked the highest based on the Risk Priority Index discussed in section 4.1.4.

Table 4-3: Planning Team Hazard List

Hazard
Flooding
Tornado
Dam or Levee Failure
Thunderstorms
Winter Storms
Hazardous Materials Release
Earthquakes
Excessive Heat/Drought
Fire
Subsidence

4.1.4 Calculating the Risk Priority Index

The first step in determining the Risk Priority Index (RPI) was to have the planning team members generate a list of hazards which have occurred or could potentially hit their community. Next, the planning team members were asked to assign a likelihood rating based on the criteria and methods described in the following table. Table 4-4 displays the probability of the future occurrence ranking. This ranking was based upon previous history and the definition of hazard. Using the definitions given, the likelihood of future events is quantified which results in the classification within one of the four ranges of likelihood.

Table 4-4: Future Occurrence Ranking

Probability	Characteristics
4 - Highly Likely	Event is probable within the calendar year. Event has up to 1 in 1 year chance of occurring. (1/1=100%) History of events is greater than 33% likely per year.
3 - Likely	Event is probable within the next three years. Event has up to 1 in 3 years chance of occurring. (1/3=33%) History of events is greater than 20% but less than or equal to 33% likely per year.
2 - Possible	Event is probable within the next five years. Event has up to 1 in 5 years chance of occurring. (1/5=20%) History of events is greater than 10% but less than or equal to 20% likely per year.
1 - Unlikely	Event is possible within the next ten years. Event has up to 1 in 10 years chance of occurring. (1/10=10%) History of events is less than or equal to 10% likely per year.

Next, planning team members were asked to consider the potential magnitude/severity of the hazard according to the severity associated with past events of the hazard. Table 4-5 gives four classifications of magnitude/severity.

Table 4-5: Hazard Magnitude

Magnitude/Severity	Characteristics
8 - Catastrophic	Multiple deaths. Complete shutdown of facilities for 30 or more days. More than 50% of property is severely damaged.

Magnitude/Severity	Characteristics
4 - Critical	Injuries and/or illnesses result in permanent disability. Complete shutdown of critical facilities for at least 14 days. More than 25% of property is severely damaged.
2 - Limited	Injuries and/or illnesses do not result in permanent disability. Complete shutdown of critical facilities for more than seven days. More than 10% of property is severely damaged.
1 - Negligible	Injuries and/or illnesses are treatable with first aid. Minor quality of life lost. Shutdown of critical facilities and services for 24 hours or less. Less than 10% of property is severely damaged.

Finally, the RPI was calculated by multiplying the probability by the magnitude/severity of the hazard. Using these values, the planning team members where then asked to rank the hazards. Table 4-6 identifies the RPI and ranking for each hazard facing Saline County.

Table 4-6: Saline County Hazards (RPI)

Hazard	Probability	Magnitude/Severity	Risk Priority Index	Rank
Thunderstorms	4	2	8	1
Tornado	3	8	24	2
Flooding	4	4	16	3
Dam or Levee Failure	2	4	8	4
Earthquakes	1	8	8	5
Hazardous Materials Release	2	4	8	6
Subsidence	3	3	9	7
Excessive Heat/Drought	3	3	9	8
Winter Storms	2	2	4	9
Fire	1	4	4	10

4.1.5 Jurisdictional Hazard Ranking

Because the jurisdictions in Saline County differ in their susceptibilities to certain hazards, hazards identified by the planning team were ranked by each individual jurisdiction using the methodology outlined in Section 4.1.3. The SIUC rankings were based on input from the planning team members, available historical data, and the hazard modeling results described within this hazard mitigation plan. During the five-year review of the plan, this table will be updated by the planning team to ensure these jurisdictional rankings accurately reflect each community's assessment of these hazards. Table 4-7 lists the jurisdictions and their respective hazard rankings (Ranking 1 being the highest concern).

Table 4-7: Hazard Rankings by Jurisdiction

Jurisdiction	Hazard									
	Tornado	HAZ-MAT	Earth-quake	Thunder-storms	Flood-ing	Dam/ Levee Failure	Winter Storms	Fire	Subsi-dence	Heat/ Drought
City of Harrisburg*	2	5	6	1	3	4	9	10	7	8
City of Eldorado*	2	5	6	1	3	4	9	10	7	8
Village of Galatia*	2	5	6	1	3	4	9	10	7	8
Village of Carrier Mills*	2	5	6	1	3	4	9	10	7	8
Village of Raleigh*	2	3	4	1	N/A	N/A	7	8	7	8
Village of Muddy*	2	5	6	1	3	4	9	10	7	8
Saline County	2	6	5	1	3	4	9	10	7	8

*SIUC ranked the hazards for these jurisdictions.

4.1.6 GIS and Hazus-MH

The third step in this assessment is the risk analysis, which quantifies the risk to the population, infrastructure, and economy of the community. Where possible, the hazards were quantified using GIS analyses and Hazus-MH. This process reflects a Level 2 approach to analyzing hazards as defined for Hazus-MH. The approach involves substitution of selected Hazus-MH default data with local data. This process improves the accuracy of model predictions.

Hazus-MH generates a combination of site-specific and aggregated loss estimates, depending upon the analysis options that are selected and the input that is provided by the user. It is important to note that Hazus-MH is not intended to be a substitute for detailed engineering studies. Rather, it is intended to serve as a planning aid for communities interested in assessing their risk to flood-, earthquake-, and hurricanerelated hazards. This documentation does not provide full details on the processes and procedures completed in the development of this project, but are available upon request.

Table 4-8 indicates which hazard risk analyses were completed in GIS, Hazus-MH, or using historical hazard records.

Table 4-8: List of risk assessment tools used for each hazard

Hazard	Risk Assessment Tool(s)
Tornado	GIS-based
Winter Storms	Historical Records
Severe Thunderstorm	Historical Records
Flooding	Hazus-MH
Fire	Historical Records
Hazmat	GIS-based
Dam or Levee Failure	Hazus-MH
Earthquakes	Hazus-MH
Subsidence	GIS-based

4.2 Vulnerability Assessment

4.2.1 Asset Inventory

4.2.1.1 Processes and Sources for Identifying Assets

The Hazus-MH data is based on the best available national data sources. The initial step involved updating the default Hazus-MH data using State of Illinois data sources. At Meeting 1, the planning team members were provided with a plot and report of all Hazus-MH critical facilities. The planning team took GIS data provided by SIUC, verified the datasets using local knowledge, and allowed SIUC to use their local GIS data for additional verification. SIUC GIS analysts made these updates and corrections to the Hazus-MH data tables prior to performing the risk assessment. These changes to the Hazus-MH inventory contribute to a Level 2 analysis, which improved the accuracy of the model predictions.

The default Hazus -MH data have been updated as follows:

- The Hazus -MH defaults, critical facilities, and essential facilities have been updated based on the most recent available data sources. Critical and essential point facilities have been reviewed, revised, and approved by local subject-matter experts.
- The essential facility updates (schools, medical care facilities, fire stations, police stations, and EOCs) have been applied to the Hazus -MH model data. Hazus -MH reports of essential facility losses reflect updated data.

The following assumptions were made during the analysis:

- The building exposure for earthquake analysis used Hazus -MH default data.
- The analysis is restricted to the county boundaries. Events that occur near the county boundaries do not contain damage assessments from adjacent counties.

4.2.1.2 Essential Facilities List

Table 4-9 identifies the essential facilities that were added or updated for the analysis. Essential facilities are a subset of critical facilities. A map and list of all critical facilities is included as Appendices E and F.

Table 4-9: Essential Facilities

Facility	Number of Facilities
Care Facilities	13
Emergency Operations Centers	1
Fire Stations	4
Police Stations	4
Schools	13

4.2.1.3 Facility Replacement Costs

Facility replacement costs and total building exposure are identified in Table 4-10. The replacement costs have not been updated by local data. The total estimated building exposure is greater than $1.5 billion. Table 4-10 also includes the estimated number of buildings within each occupancy class.

Table 4-10: Building Exposure

General Occupancy	Estimated Total Buildings	Total Building Exposure (x $1000)
Residential	9,984	$722,494
Agriculture	312	$14,192
Commercial	864	$265,062
Education	11	$125,000
Government	99	$49,500
Religion	133	$133,000
Industrial	26	$203,828
Total	11,429	$1,513,075

4.3 Future Development

As the county's population grows, the residential and urban areas will extend further into the county, placing more pressure on existing transportation and utility infrastructure while increasing the rate of farmland conversion; Saline County will address specific mitigation strategies in Section 5 to alleviate such issues.

Because Saline County is vulnerable to a variety of natural and technological threats, the county government—in partnership with state government—must make a commitment to prepare for the management of these types of events. Saline County is committed to ensuring that county elected and appointed officials become informed leaders regarding community hazards so that they are better prepared to set and direct policies for emergency management and county response.

4.4 Hazard Profiles

4.4.1 Tornado Hazard

Hazard Definition

Tornadoes pose a proven and substantial risk to Illinois and its citizens. Tornadoes can occur at any time during the day or night. They can happen during any month of the year. The unpredictability of tornadoes makes them one of the state's most dangerous hazards. Tornado winds are violently destructive when they touch down in developed and populated areas. Current estimates place maximum wind velocity at about 300 miles per hour, but higher and lower values can occur. A wind velocity of 200 miles per hour will result in a pressure of 102.4 pounds per square foot of surface area—a load that exceeds the tolerance limits of most buildings. Considering these factors, it is easy to understand why tornadoes can be so devastating for the communities they hit.

Tornadoes are defined as violently rotating columns of air extending from thunderstorms to the ground. Funnel clouds are rotating columns of air not in contact with the ground; however, the violently rotating column of air can reach the ground very quickly and become a tornado. If the funnel cloud picks up and blows debris, it has reached the ground and is a tornado.

Tornadoes are classified according to the Enhanced Fujita tornado intensity scale. The Enhanced Fujita scale ranges from intensity F0, with effective wind speeds of 40 to 70 miles per hour, to F5 tornadoes, with effective wind speeds of over 260 miles per hour. The Enhanced Fujita intensity scale is described in Table 4-11.

Table 4-11: Enhanced Fujita Tornado Rating

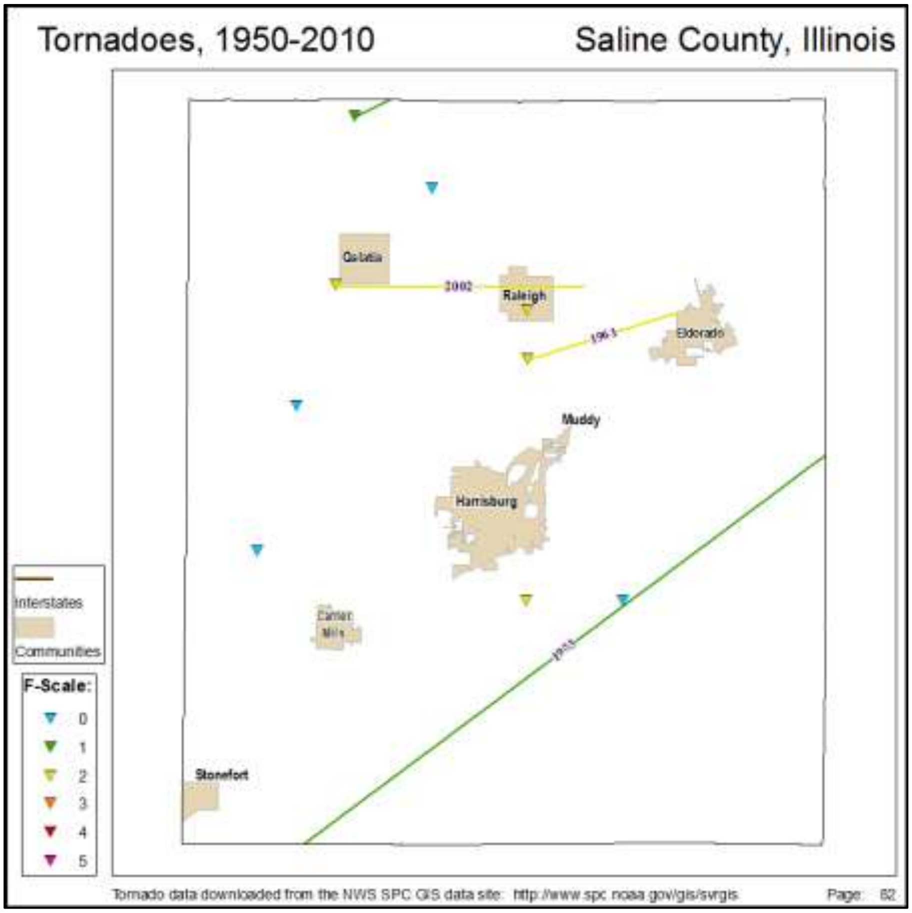
Enhanced Fujita Number	Estimated Wind Speed	Path Width	Path Length	Description of Destruction
0 *Gale*	40-72 mph	6-17 yards	0.3-0.9 miles	Light damage, some damage to chimneys, branches broken, sign boards damaged, shallow-rooted trees blown over.
1 *Moderate*	73-112 mph	18-55 yards	1.0-3.1 miles	Moderate damage, roof surfaces peeled off, mobile homes pushed off foundations, attached garages damaged.
2 *Significant*	113-157 mph	56-175 yards	3.2-9.9 miles	Considerable damage, entire roofs torn from frame houses, mobile homes

Enhanced Fujita Number	Estimated Wind Speed	Path Width	Path Length	Description of Destruction
				demolished, boxcars pushed over, large trees snapped or uprooted.
3 *Severe*	158-206 mph	176-566 yards	10-31 miles	Severe damage, walls torn from well-constructed houses, trains overturned, most trees in forests uprooted, heavy cars thrown about.
4 *Devastating*	207-260 mph	0.3-0.9 miles	32-99 miles	Complete damage, well-constructed houses leveled, structures with weak foundations blown off for some distance, large missiles generated.
5 *Incredible*	261-318 mph	1.0-3.1 miles	100-315 miles	Foundations swept clean, automobiles become missiles and thrown for 100 yards or more, steel-reinforced concrete structures badly damaged.

Previous Occurrences of Tornadoes

There have been several occurrences of tornadoes within Saline County during the past few decades. The NCDC database reported thirteen tornadoes/funnel clouds in Saline County since 1957. The Illinois State Water Survey produced maps of historical tornado path as seen in Figure 4-2. The most recent recorded event occurred in February 2012 when an EF4 tornado ripped through Harrisburg with winds topping 207 mph.

Figure 4-2: Tornados in Saline County1950-2010



NCDC recorded twelve tornadoes in Saline County as of January 2012. Table 4-12 lists tornadoes that caused significant damages. The most recent tornado, which occurred in February of 2012 is not listed in this table; however, the state awarded $13 million to assist in short-term recovery efforts from the disaster. Additional details of individual hazard events can be found on the NCDC website.

Table 4-12: NCDC-Recorded Damaging Tornadoes in Saline County

Location or County*	Date	Magnitude	Deaths	Injuries	Property Damage (x$1000)
Saline	12/19/1957	F2	0	0	25
Saline	3/6/1961	F2	0	2	250
Saline	1/10/1975	F2	0	0	250
Saline	10/3/1990	F1	0	0	250
Galatia	4/28/2002	F2	0	3	3,500
		Total	0	5	$4.3 million

*NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

Geographic Location for Tornado Hazard

The entire county has the essential same risk for occurrence of tornadoes. They can occur at any location within the county.

Hazard Extent for Tornado Hazard

Historically tornadoes generally moved from southwest to northeast across the county. The extent of the hazard varies both in terms of the size of the tornado, its path and the wind speed.

Risk Identification for Tornado Hazard

Based on historical information, the probability of future tornadoes in Saline County is likely. Tornadoes with varying magnitudes are expected to happen. According to the RPI, tornadoes ranked as the number two hazard.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
3	x	8	=	24

Vulnerability Analysis for Tornado Hazard

Tornadoes can occur within any area in the county; therefore, the entire county population and all buildings are vulnerable to tornadoes. To accommodate this risk, this plan will consider all buildings located within the county as vulnerable. The existing buildings and infrastructure in Saline County are discussed in Table 4-8 and 4-9.

Critical Facilities

All critical facilities are vulnerable to tornadoes. A critical facility is susceptible to many of the same impacts as any other building within the jurisdiction. These impacts will vary based on the magnitude of the tornado but can include structural failure, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, and loss of facility functionality (e.g., a damaged police station will no longer be able to serve the community). Table 4-9 lists the types and numbers of all of the essential facilities in the area. A map and list of all critical facilities is included in Appendices E and F.

Building Inventory

The building exposure in terms of types and numbers of buildings for the entire county is listed in Table 4-10. The buildings within the county can all expect the same impacts, similar to those discussed for critical facilities. These impacts include structural failure, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, and loss of building function (e.g., damaged home will no longer be habitable causing residents to seek shelter).

Infrastructure

During a tornado, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is vulnerable, it is important to emphasize that any number of these structures could become damaged during a tornado. The impacts to these structures include broken, failed, or impassable roadways, broken or failed utility lines (e.g., loss of power or gas to community), and railway failure from broken or impassable rail lines. Bridges could fail or become impassable, causing risk to traffic.

GIS-based Tornado Analysis

Two tornado scenarios were run for Saline County: Scenario 1 (historical) included a historical tornado path through Galatia and Raleigh; Scenario 2 (hypothetical) ran southwest to northeast from Stonefort through Eldorado. These scenarios were selected by the mitigation planning team. The following analysis quantifies the anticipated impacts of tornadoes in the county, in terms of numbers and types of buildings and infrastructure damaged.

GIS overlay modeling was used to determine the potential impacts of a historical F2 tornado and a hypothetical F4 tornado. The selected widths were modeled after a recreation of the Enhanced Fujita-Scale guidelines based on conceptual wind speeds, path widths, and path lengths. There is no guarantee that every tornado will fit exactly into one of these six categories. Table 4-13 depicts tornado damage curves as well as path widths (NOAA).

Table 4-13: Tornado Path Widths and Damage Curves

Fujita Scale	Path Width (feet)	Maximum Expected Damage
5	2,400	100%
4	1,800	100%
3	1,200	80%
2	600	50%
1	300	10%
0	150	0%

Within any given tornado path, there are degrees of damage depending on proximity. The most intense damage occurs within the center of the damage path, with decreasing amounts of damage away from the center. After the hypothetical path is digitized on a map, damages were modeled in GIS by adding buffers (damage zones) around the tornado path. Figure 4-3 and Table 4-14 describe the zone analysis. The selected historical and hypothetical tornado path is depicted in Figure 4-4 and 4-5.

Figure 4-3: Tornado Analysis (Damage Curves) Using GIS Buffers

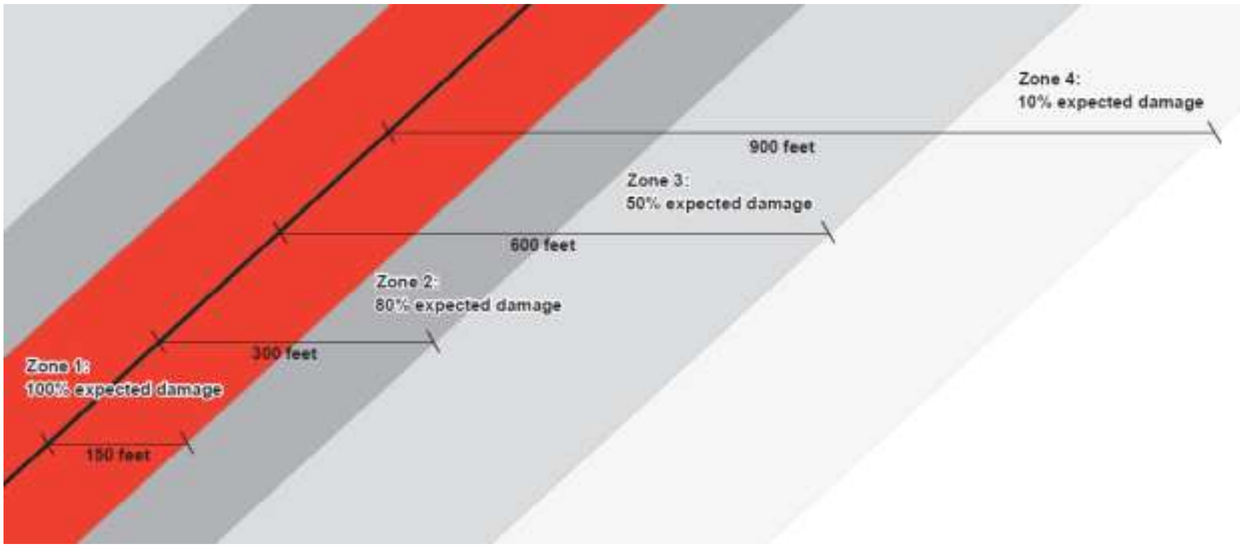


Table 4-14: F4 Tornado Analysis Using GIS Buffers

Zone	Buffer (feet)	Damage Curve
1	0-150	100%
2	150-300	80%
3	300-600	50%
4	600-900	10%

Figure 4-4: Historical Tornado Path through Galatia and Raleigh, IL

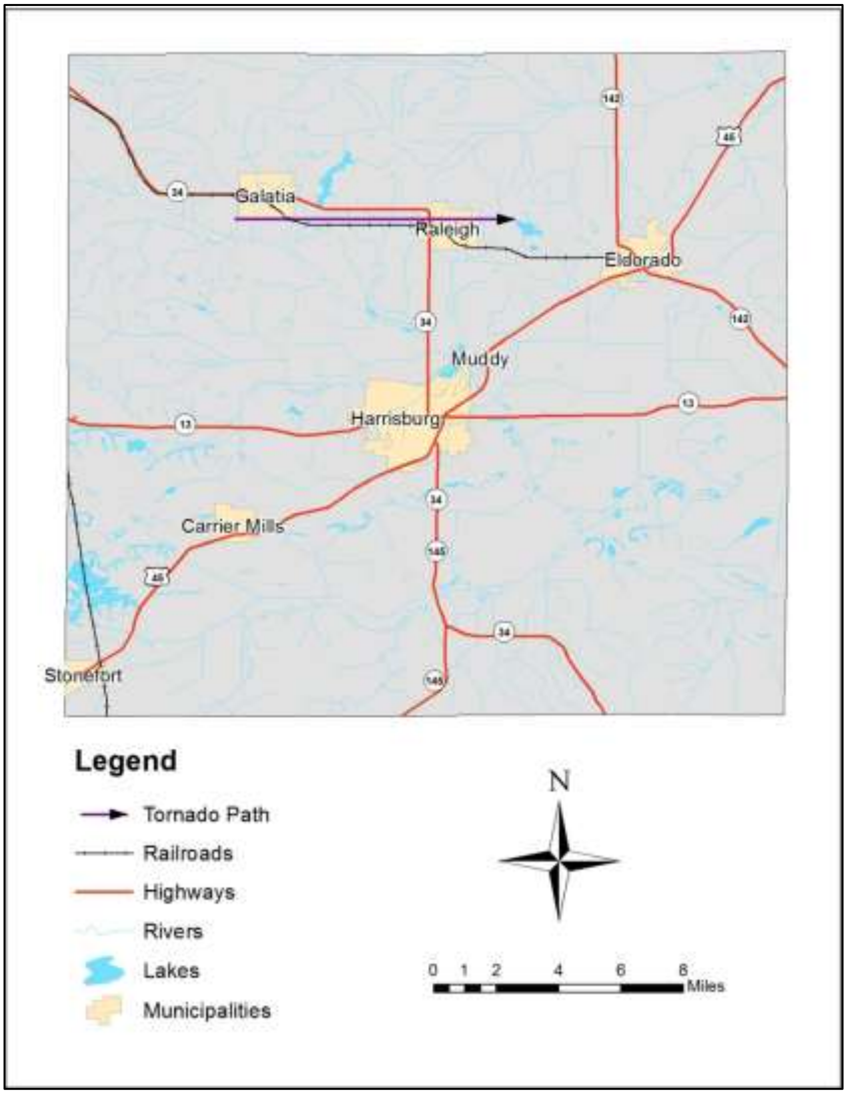
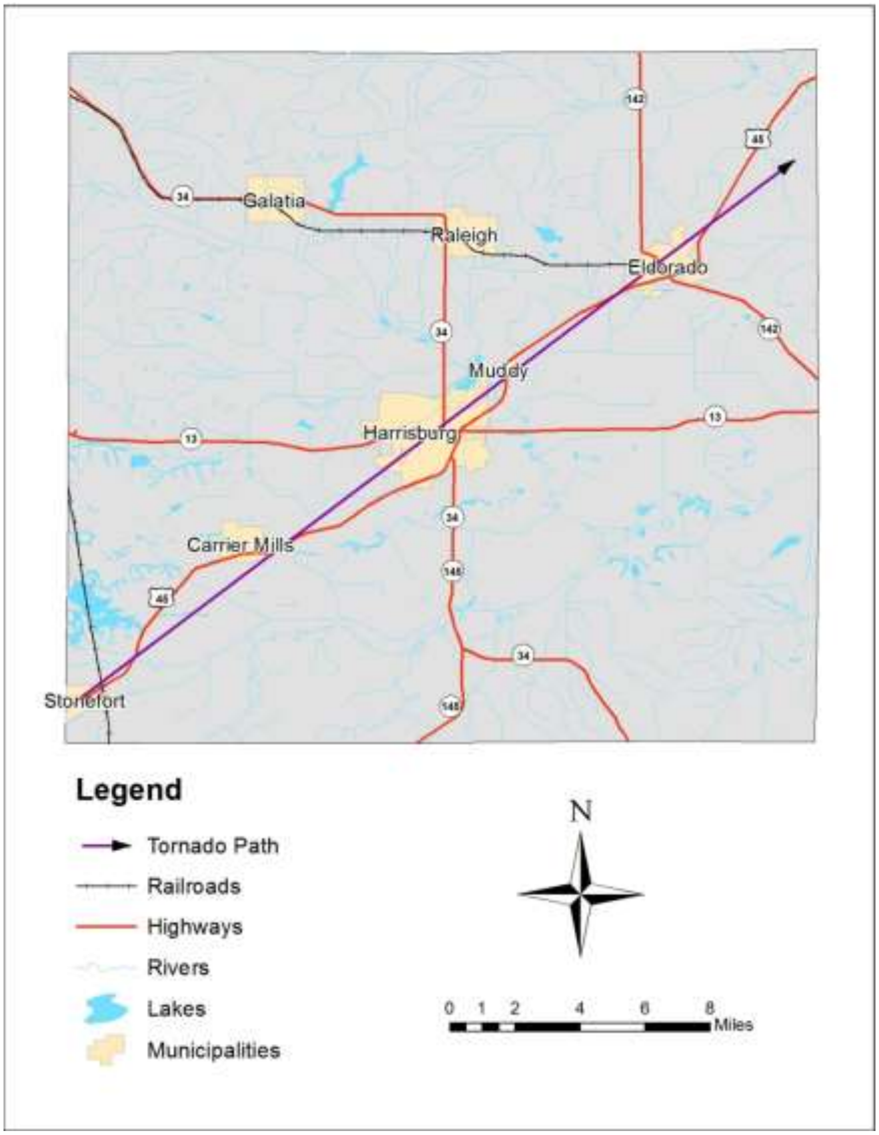


Figure 4-5: Hypothetical Tornado Path from Stonefort to Eldorado, IL



Modeled Impacts of a historical and hypothetical tornado path in Saline County, IL

The results of the analysis are shown in Tables 4-15 and Table 4-16. For the historical scenario, the GIS analysis estimates that 53 buildings would be damaged. The estimated building losses were over $2.4 million. For the hypothetical scenario, the GIS analysis estimates that 1,733 buildings would be damaged. The estimated building losses were over $72.1 million. The building losses are an estimate of building replacement costs multiplied by the percentages of damage.

Table 4-15: Estimated Building Losses by Occupancy Type for the Historical Scenario (X $1000)

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	$649	$0	$1,180	$90
Commercial	$0	$0	$145	$0
Industrial	$0	$0	$0	$0
Agriculture	$12	$0	$0	$0
Religious	$0	$0	$250	$100
Government	$0	$0	$0	$0
Education	$0	$0	$0	$0
Total	$660	$0	$1,576	$190

Table 4-16: Estimated Building Losses by Occupancy Type for the Hypothetical Scenario (X $1000)

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	$9,725	$13,972	$15,620	$2,892
Commercial	$11,895	$3,816	$3,903	$2,083
Industrial	$0	$0	$0	$0
Agriculture	$0	$61	$23	$30
Religious	$2,000	$1,200	$2,750	$450
Government	$500	$880	$0	$325
Education	$0	$0	$0	$0
Total	$24,120	$19,929	$22,296	$5,780

Critical Facilities Damage

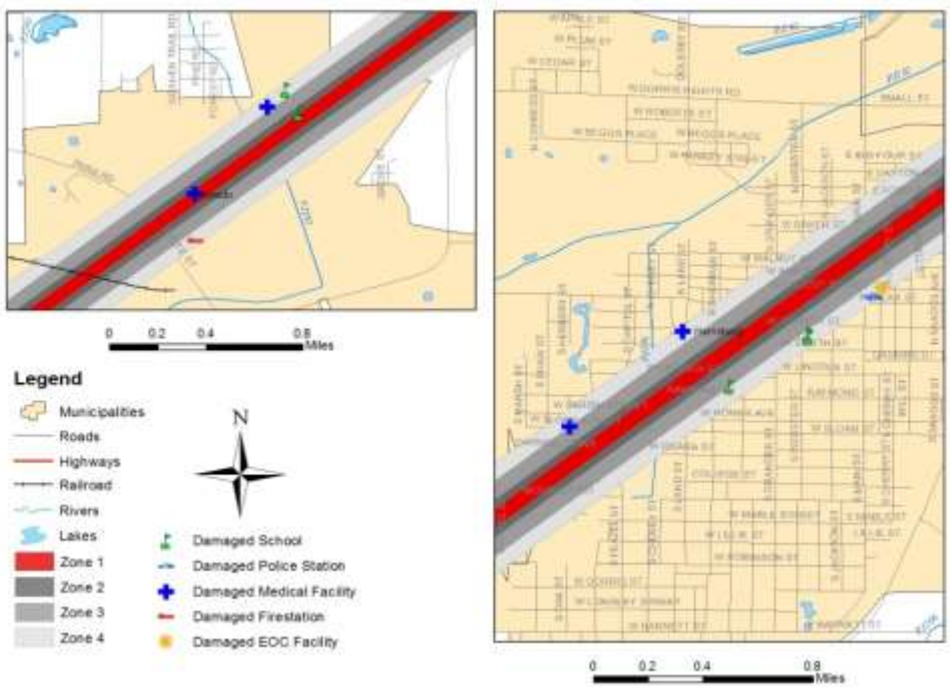
There are no critical facilities located within the 900 foot buffer of the historical tornado path. There are 13 critical facilities located within 900 feet of the hypothetical tornado path. The affected facilities are identified in Table 4-17, and their geographic locations are shown in Figures 4-6.

Table 4-17: Critical Facilities within the F4 Hypothetical Tornado between Stonefort and Eldorado, IL

Critical Facility	Facility Name
Emergency Operations Centers	Ferrell Hospital
	Saline Care Center
	Brooke Hill Residential Facility
	Harrisburg Care Center
Fire Stations	Eldorado Fire Department
Medical Care Facilities	Harrisburg Emergency Services
Police Stations	Saline County Sheriff's Office
	Harrisburg Police Department

Critical Facility	Facility Name
Schools	Eldorado High School
	Harrisburg High School
	Harrisburg Jr. High School
	West Side Primary School
	Eldorado Christian Academy

Figure 4-6: Essential Facilities Affected by Hypothetical F4 Tornado from Stonefort to Eldorado, IL



Vulnerability to Future Assets/Infrastructure for Tornado Hazard

The entire population and all buildings have been identified as at-risk because tornadoes can occur anywhere within the state, at any time of the day, and during any month of the year. Furthermore, any future development in terms of new construction within the county will be at risk. The building exposure for Saline County is included in Table 4-9.

All critical facilities in the county and communities within the county are at-risk. A map and list of all critical facilities is included as Appendices E and F.

Suggestions for Community Development Trends

Preparing for severe storms will be enhanced if officials sponsor a wide range of programs and initiatives to address the overall safety of county residents. New structures need to be built with more sturdy construction, and those structures already in place can be hardened to lessen the potential impacts of severe weather. Establishment of warning sirens will warn the community of approaching storms to ensure the safety of Saline County residents.

4.4.2 Flood Hazard

Hazard Definition for Flooding

Flooding is a significant natural hazard throughout the United States. The type, magnitude, and severity of flooding are functions of the amount and distribution of precipitation over a given area, the rate at which precipitation infiltrates the ground, the geometry and hydrology of the catchment, and flow dynamics and conditions in and along the river channel. Floods can be classified as one of two types: upstream floods or downstream floods. Both types of floods are common in Illinois.

Upstream floods, also called flash floods, occur in the upper parts of drainage basins and are generally characterized by periods of intense rainfall over a short duration. These floods arise with very little warning and often result in locally intense damage, and sometimes loss of life, due to the high energy of the flowing water. Flood waters can snap trees, topple buildings, and easily move large boulders or other structures. Six inches of rushing water can upend a person; another 18 inches might carry off a car. Generally, upstream floods cause damage over relatively localized areas, but they can be quite severe in the local areas in which they occur. Urban flooding is a type of upstream flood. Urban flooding involves the overflow of storm drain systems or be a result inadequate drainage combined with heavy rainfall or rapid snowmelt. Upstream or flash floods can occur at any time of the year in Illinois, but they are most common in the spring and summer months.

Downstream floods, sometimes called riverine floods, refer to floods on large rivers at locations with large upstream catchments. Downstream floods are typically associated with precipitation events that are of relatively long duration and occur over large areas. Flooding on small tributary streams may be limited, but the contribution of increased runoff may result in a large flood downstream. The lag time between precipitation and time of the flood peak is much longer for downstream floods than for upstream floods, generally providing ample warning for people to move to safe locations and, to some extent, secure some property against damage. Riverine flooding on the large rivers of Illinois generally occurs during either the spring or summer.

Hazard Definition for Dam and Levee Failure

Dams are structures that retain or detain water behind a barrier. When full or partially full, the difference in elevation between the water above the dam and below creates large amounts of potential energy, creating the potential for failure. The same potential exists for levees when they serve their purpose, which is to confine flood waters within the channel area of a river and exclude that water from land or communities landward of the levee. Dams and levees can fail due to either 1) water heights or flows above the capacity for which the structure was designed; or 2) deficiencies in the structure such that it cannot hold back the potential energy of the water. If a dam or levee fails, issues of primary concern include loss of human life/injury, downstream property damage, lifeline disruption (of concern would be transportation routes and utility lines required to maintain or protect life), and environmental damage.

Many communities view both dams and levees as permanent and infinitely safe structures. This sense of security may well be false, leading to significantly increased risks. Both downstream of dams and on floodplains protected by levees, security leads to new construction, added infrastructure, and increased population over time. Levees in particular are built to hold back flood waters only up to some maximum level, often the 100-year (1% annual probability) flood event or less. When that maximum is exceeded by more than the design safety margin, the levee will be overtopped or otherwise fail, inundating communities in the land previously protected by that levee. It has been suggested that climate change, land-use shifts, and some forms of river engineering may be increasing the magnitude of large floods and the probability of levee failure situations.

In addition to failure that results from extreme floods above the design capacity, levees and dams can fail due to structural deficiencies. Both dams and levees require constant monitoring and regular maintenance to assure their integrity. Many structures across the U.S. have been under-funded or otherwise neglected, leading to an eventual day of reckoning in the form either of realization that the structure is unsafe or, sometimes, an actual failure. The threat of dam or levee failure may require substantial commitment of time, personnel, and resources. Since dams and levees deteriorate with age, minor issues become larger compounding problems, and the risk of failure increases.

Previous Occurrences of Flooding

The NCDC database reported 37 flood events in Saline County since 1996. These flood events attributed to nearly $21.0 million in property losses. In March 2008, major spring flooding causes $16.8 million in damage in Galatia. Saline County continues to have flooding problems, including during the spring of 2011 when a federal disaster was declared.

Saline County NCDC recorded over thirty flood-events, twelve of these reported significant losses which are listed in Table 4-18. Additional details of individual hazard events can be found on the NCDC website.

Table 4-18: NCDC-Records of Damaging Flooding in Saline County

Location or County*	Date	Type	Deaths	Injuries	Property Damage (x$1000)	Crop Damage (x$1000)
Harrisburg	4/28/1996	Flash Flood	0	0	1,500	50
Harrisburg	5/10/1996	Flash Flood	0	0	1,500	0
Saline	5/2/1998	Flash Flood	0	0	5	0
Eldorado	8/28/2005	Flash Flood	0	0	5	0
Saline	11/15/2005	Flash Flood	0	0	75	0
Harrisburg	3/11/2006	Flash Flood	0	0	15	0
Saline	9/22/2006	Flash Flood	0	0	3	0
Saline	12/17/2001	Flood	0	0	8	0
Saline	1/5/2005	Flood	0	0	700	0
Galatia	3/18/2008	Flood	0	0	16,800	0
Rileyville	5/1/2011	Flood	0	0	60	0

Location or County*	Date	Type	Deaths	Injuries	Property Damage (x$1000)	Crop Damage (x$1000)
Saline	1/22/1999	Urban/sml Stream Fld	0	0	80	0
Total			0	0	$20,754	$50

*NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

Previous Occurrences of Dam and Levee Failure

According to the Saline County mitigation planning team, there are no records or local knowledge of any dam or certified levee failure in the county.

Repetitive Loss Properties

FEMA defines a repetitive loss structure as a structure covered by a contract of flood insurance issued under the NFIP, which has suffered flood loss damage on two or more occasions during a 10-year period that ends on the date of the second loss, in which the cost to repair the flood damage is ≥ 25% of the market value of the structure at the time of each flood loss.

The Illinois Emergency Management Agency (IEMA) was contacted to determine the location of repetitive loss structures. There are no repetitive loss structures in Saline County.

Geographic Location for Flooding

Most river-flooding in Illinois occurs in the spring to early summer and is the result of excessive rainfall and/or the combination of rainfall and snowmelt. Severe thunderstorms may cause flooding during the summer or fall, but tend to be localized. The primary source of river flooding in Saline County is the Saline River.

Flash floods, brief heavy flows in small streams or normally dry creek beds, also occur within the county.

The DFIRM was used to identify specific stream reaches for analysis. The areas of riverine flooding are depicted on the map in Appendix D.

NOAA's Advanced Hydrologic Prediction Service provides information from gauge locations at points along various rivers across the United States. For Saline County, no data is provided. The Illinois Water Survey in conjunction with the USGS is currently working to install two new gauging stations along the Saline River to improve flood forecasting.

Geographic Location for Dam and Levee Failure

Hazus-MH identified thirteen dams in Saline County. Table 4-19 summarizes the dam and levee information. A map of dam and levee location is in Appendix D.

Table 4-9: National Inventory of Dams for Saline County, IL

Dam Name	River	Hazard	EAP
New Harrisburg Reservoir Dam	Trib Middle Fork Saline River	S	Y
Glen O. Jones Lake Dam	Horseshoe Creek	S	Y
Eldorado Reservoir Dam	Trib Wolf Creek	H	Y
Kerr-Mcgee/Galatia Mine/Slurry Pond Dam	Trib Middle Fork Saline River	L	N
Western Fuels Assoc/Brushy Cr/Main Slurr	Trib Brushy Creek	L	N
Kerr Mcgee/Galatia/Sed Pond 2 Dam	Trib Middle Fork Saline River	L	N
Western Fuels Assoc/Brushy Cr/West Slurr	Trib Brushy Creek	S	N
Western Fuels Assoc/Brushy Cr/East Slurr	Trib Brushy Creek	L	N
Western Fuels Assoc/Brushy Cr/Freshwater	Trib Brushy Creek	L	N
Harrisburg Reservoir Dam	Middle Fork Saline-Offstream	L	N
Potters Pond Dam	Trib Middle Fork Saline River	L	N
Western Fuels/Brushy Creek/Slurry Cell 4	Trib Brushy Creek	L	N
Kerr-Mcgee/Galatia/Chloride Water Pond D	Middle Fork Saline River	L	N

Hazard Extent for Flooding

The Hazus-MH flood model is designed to generate a flood depth grid and flood boundary polygon by deriving hydrologic and hydraulic information based on user-provided elevation data or by incorporating selected output from other flood models. Hazus-MH also has the ability to clip a Digital Elevation Model (DEM) with a user-provided flood boundary, thus creating a flood depth grid. For Saline County, Hazus-MH generated a flood-depth grid for the 100-year flood boundary from the Saline County DFIRM.

Flood hazard scenarios were modeled using GIS analysis and Hazus-MH. The flood hazard modeling was based on historical occurrences and current threats. DFRIM maps were used to identify the areas of study. Planning team input and a review of historical information provided additional information on specific flood events.

Hazard Extent for Dam and Levee Failure

When dams are assigned the low (L) hazard potential classification, it means that failure or incorrect operation of the dam will result in no human life losses and no economic or environmental losses. Losses are principally limited to the owner's property. Dams assigned the significant (S) hazard classification are those dams in which failure or incorrect operation results in no probable loss of human life; however dam or levee failure can cause economic loss, environment damage, and disruption of lifeline facilities. Dams classified as significant hazard potential dams are often located in predominantly rural or agricultural areas, but could be located in populated areas with a significant amount of infrastructure. Dams assigned the high

(H) hazard potential classification are those dams in which failure or incorrect operation has the highest risk to cause loss of human life and significant damage to buildings and infrastructure.

According to Hazus-MH data, only one dam in Saline County is classified as high hazard and three dams have Emergency Action Plans (EAP). An EAP is not required by the State of Illinois but is strongly recommended by the Illinois Department of Natural Resources.

Accurate mapping of the risks of flooding behind levees depends on knowing the condition and level of protection the levees actually provide. FEMA and the U.S. Army Corps of Engineers are working together to make sure that flood hazard maps clearly reflect the flood protection capabilities of levees, and that the maps accurately represent the flood risks posed to areas situated behind them. Levee owners—usually states, communities, or in some cases private individuals or organizations—are responsible for ensuring that the levees they own are maintained according to their design. In order to be considered creditable flood protection structures on FEMA's flood maps, levee owners must provide documentation to prove the levee meets design, operation, and maintenance standards for protection against the one-percent-annual chance flood.

Risk Identification for Flood Hazard

Based on historical information, future occurrence of flooding in Saline County is highly probable. According to the Risk Priority Index (RPI), flooding is ranked as the number three hazard.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
3	x	8	=	24

Risk Identification for Dam and Levee Failure

Based on operation and maintenance requirements and local knowledge of the dams and levees in Saline County, the probability of failure is low to moderate. However, if a high-hazard dam or levee were to fail, the magnitude and severity of the damage could be great. The warning time and duration of the dam or levee failure event would be very short. According to the RPI, dam and levee failure ranked as the number four hazard.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
2	x	4	=	8

Hazus-MH 100-Year Flood Analysis Using User-Defined Building Inventory (tax parcel information)

Hazus-MH generated the flood depth grid for a 100-year return period and made calculations by clipping the USGS one-third-arc-second DEM (~10 m) to the flood boundary. Next, we used Hazus-MH to estimate the damages for Saline County by utilizing a detailed building inventory database created from assessor parcel data. According to this analysis, there are 907 buildings located in the Saline County 100-year floodplains. The estimated damage to these structures is $60.9 million. Figure 4-7 and 4-8 depict the building inventory within the 100-year floodplain.

Figure 4-7: Saline County buildings within the 100-Year Floodplain Boundary

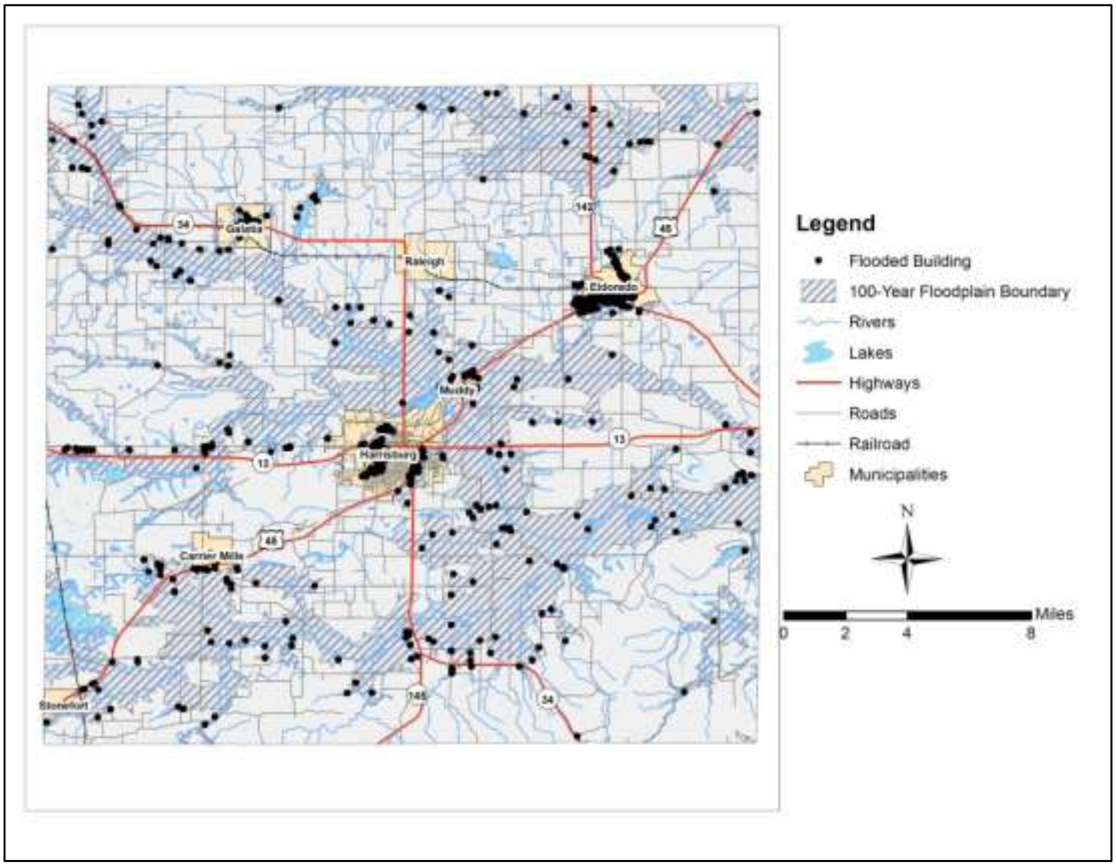
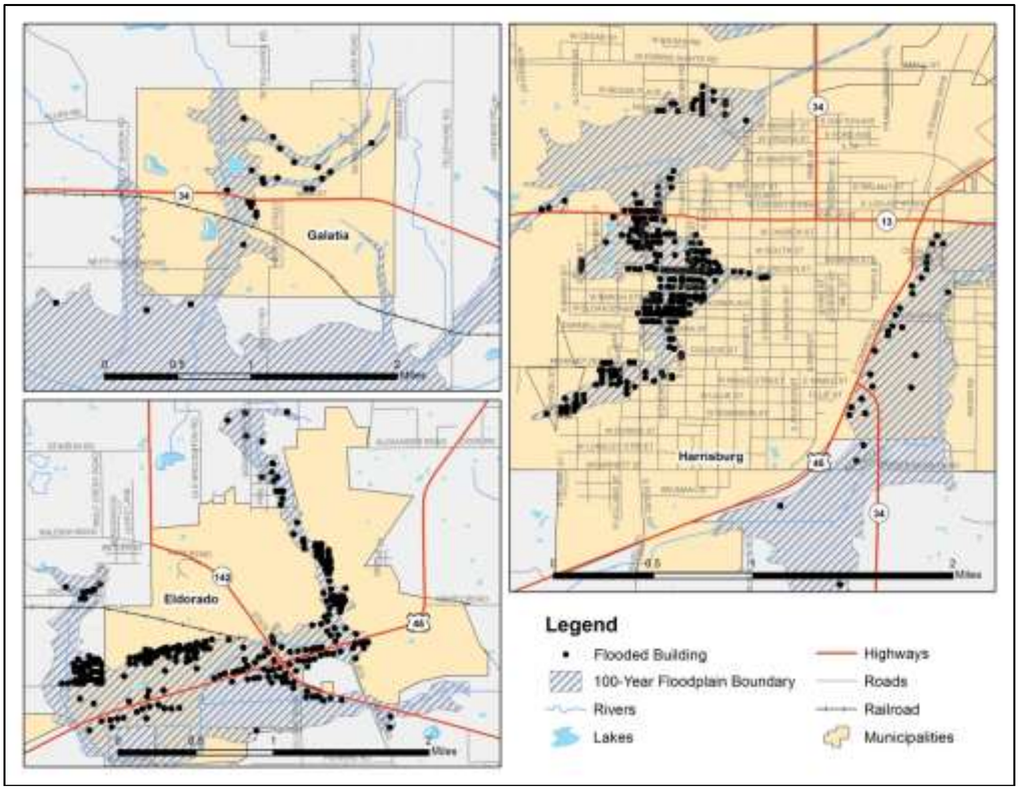


Figure 4-8: More Detailed Map of building inventory within the 100-year flood boundary



Critical Facilities

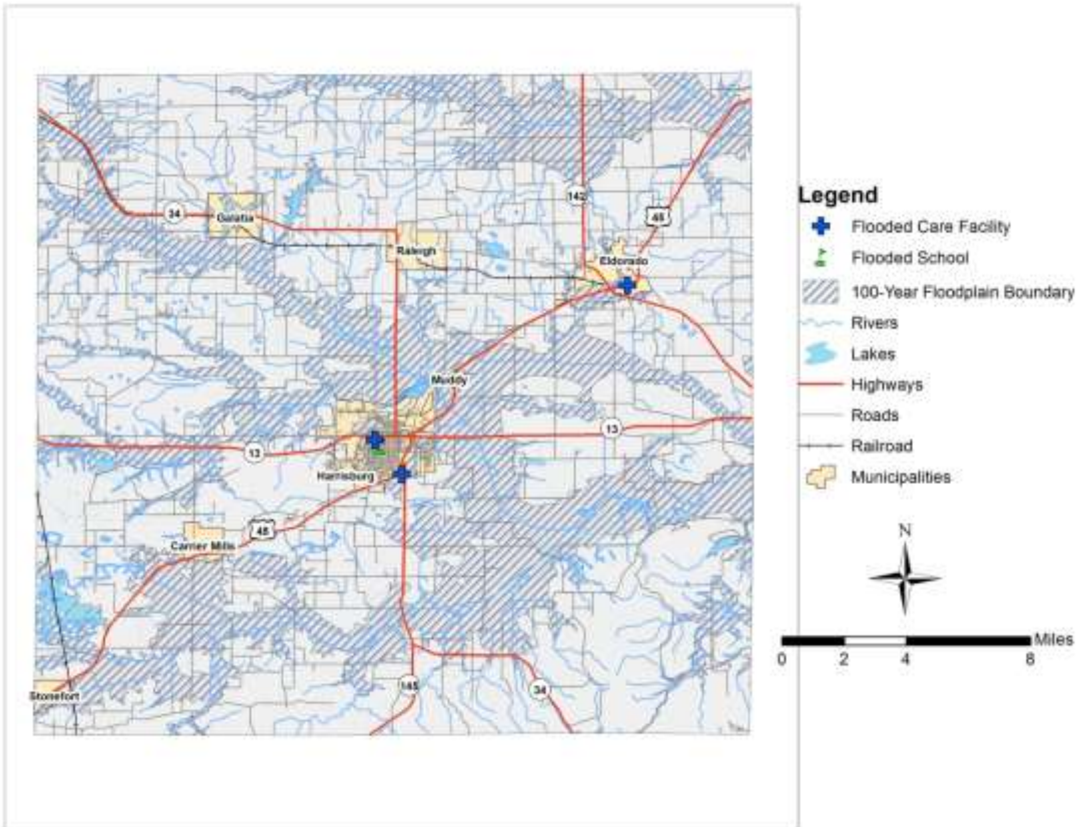
A critical facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g., a damaged police station will no longer be able to serve the community). A map and list of all critical facilities is included as Appendices E and F.

The analysis identified four critical facilities that are subject to flooding. The critical facilities are listed in Table 4-20 and the locations of these facilities are shown on Figure 4-9.

Table 4-20: List of Affected Critical Facilities for a 100-Year Flood Event

Critical Facility	Facility Name
Medical Care Facilities	Saline Care Center
	Fountain View Nursing Home
	Brookstone Estates
Schools	West Side Primary School

Figure 4-9: Map of Affected Critical Facilities by a 100-Year Flood Event



Infrastructure

The types of infrastructure that could be impacted by a flood include roadways, utility lines/pipes, railroads, and bridges. Since an extensive inventory of the infrastructure is not available for this plan, it is important to emphasize that any number of these items could become damaged in the event of a flood. The impacts to these items include broken, failed, or impassable roadways; broken or failed utility lines (e.g., loss of power or gas to community); or railway failure from broken or impassable railways. Bridges could also fail or become impassable, causing traffic risks.

Vulnerability Analysis for Flash Flooding

Flash flooding could affect any low-lying location or areas of poor drainage within this jurisdiction; therefore, a significant portion of county's population and buildings are vulnerable to a flash flood. These structures can expect the same impacts as discussed in a riverine flood.

A map and list of all critical facilities is included in Appendices E and F.

Suggestions for Community Development Trends

Controlling floodplain development is the key to reducing flood-related damages. Areas with recent development within the county may be more vulnerable to drainage issues. Storm drains and sewer systems are usually most susceptible. Damage to these can cause back-up of water, sewage, and debris into homes and basements, causing structural and mechanical damage as well as creating public health hazards and unsanitary conditions.

4.4.3 Earthquake Hazard

Hazard Definition

An earthquake is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's crust. For hundreds of millions of years, plate tectonics have shaped the Earth, as the tectonic plates that form the earth's surface move slowly over, under, and past each other. At their edges, the plates become locked together and accumulate energy until they suddenly break free, causing the ground to shake (i.e., an earthquake).

Most earthquakes occur at the boundaries where plates meet; however, some earthquakes occur in the middle of plates, as is the case for seismic zones in the Midwestern and Eastern United States. The most seismically active area in the Midwest is the New Madrid Seismic Zone. Additionally, the Wabash Valley fault system in Illinois and Indiana shows evidence of large earthquakes in its geologic history, and scientists believe there may be other, currently unidentified faults in the Midwest capable of producing strong earthquakes.

Strong earthquakes can collapse buildings and infrastructure, disrupt utilities, and sometimes trigger landslides, avalanches, flash floods, fires, and tsunamis. When an earthquake occurs in a populated area, it may cause deaths, injuries, and extensive property damage. Additionally, essential facilities, such as fire departments, police departments, and hospitals, may be damaged, disrupting emergency response services in the affected area. Strong earthquakes may also require mass relocation; however, relocation may be impossible in the short-term aftermath of a significant event due to damaged transportation infrastructure and public communication systems.

The magnitude of an earthquake measures the energy released at the earthquake's source. Intensity measures the strength of shaking produced by the earthquake at a certain location and is determined from effects on people, structures, and the natural environment. Earthquake magnitudes and their corresponding intensities are listed in Table 4-21

Source: *http://earthquake.usgs.gov/learning/topics/mag_vs_int.php*

Table 4-21: Abbreviated Modified Mercalli Intensity Scale

Mercalli Intensity	Description
I	Not felt except by a very few under especially favorable conditions.
II	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.

Mercalli Intensity	Description
V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
XI	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
XII	Damage total. Lines of sight and level are distorted. Objects thrown into the air.

Previous Occurrences for Earthquakes

Historically, the most significant seismic activity in Illinois has been associated with New Madrid Seismic Zone. The New Madrid Seismic Zone is attributed with producing three earthquakes large earthquakes in the central U.S. whose magnitudes were estimated between to be 7.0 and 7.7. These earthquakes occurred on December 16, 1811, January 23, 1812, and February 7, 1812. The earthquakes caused violent ground cracking and volcano-like eruptions of sediment (sand blows) over an area of >10,500 km^2, and uplift of a 50 km by 23 km zone (the Lake County uplift). The shaking was felt over a total area of over 10 million km^2 (the largest felt area of any historic earthquake). The United States Geological Survey (USGS) and the Center for Earthquake Research and Information (CERI) at the University of Memphis estimate the probability of a repeat of the 1811-1812 type earthquakes (magnitude 7.5-8.0) is 7%-10% over the next 50 years (USGS Fact Sheet 2006-3125).

In the past few decades, with many precise seismographs positioned across Illinois, measured earthquakes have varied in magnitude from very low microseismic events of M=1-3 to larger events up to M=5.4. The most recent earthquake in northern Illinois—as of the date of this report—occurred on February 28, 2012 about 15 km east-northeast of East St. Louis, IL and measured 2.2 in magnitude. The last earthquake in Illinois to cause minor damage occurred on April 18, 2008 near Mt. Carmel, IL and measured 5.2 in magnitude. Earthquakes resulting in more serious damage have occurred about every 70 to 90 years and have been concentrated in southern Illinois.

Geographic Location for Earthquake Hazard

Within Illinois, the two most significant zones of seismic activity are the New Madrid Zone and the Wabash Valley Fault System. In Saline County, discovery of a new fault zone was triggered after a 5.5M earthquake struck north of Harrisburg in 1968. This was the strongest felt earthquake in southern Illinois since the 1895 Missouri event that was felt across the United States and into Canada. This fault is connected to the Wabash Valley Fault Zone. There have been twelve earthquake epicenters recorded in Saline County. Figure 4-10 depicts the following: a) location of notable earthquakes in Illinois region; b) generalized geologic bedrock map with earthquake epicenters and geologic structures; c) geologic and earthquake epicenter map of Saline County. The USGS estimates the probability of a moderate M5.5 earthquake occurring in Saline County within the next 500-years at approximately 10 percent (USGS 2009; Figure 4-11).

Figure 4-10: Recorded Earthquakes in the U.S. Midwest and Geology of Saline County

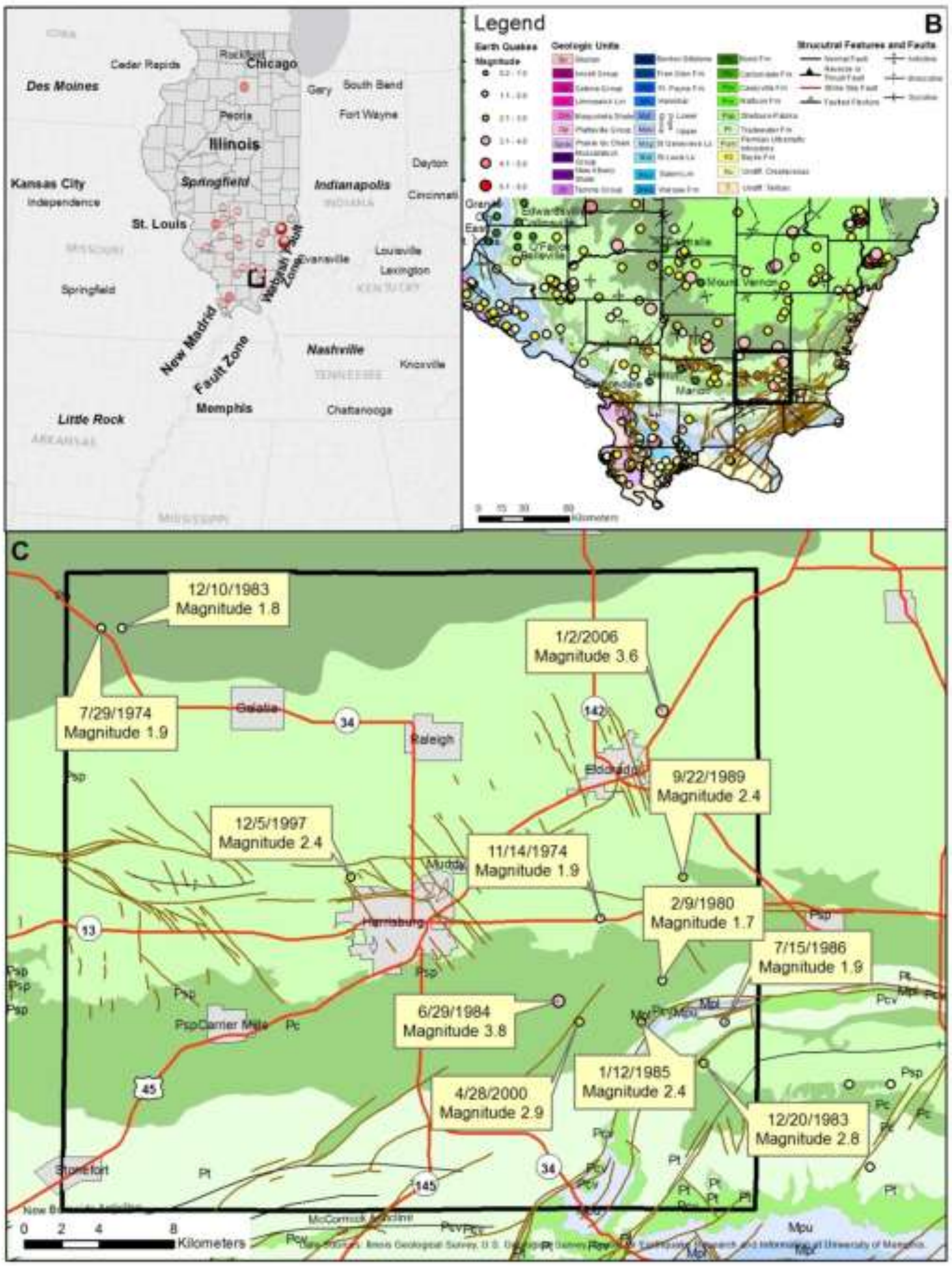
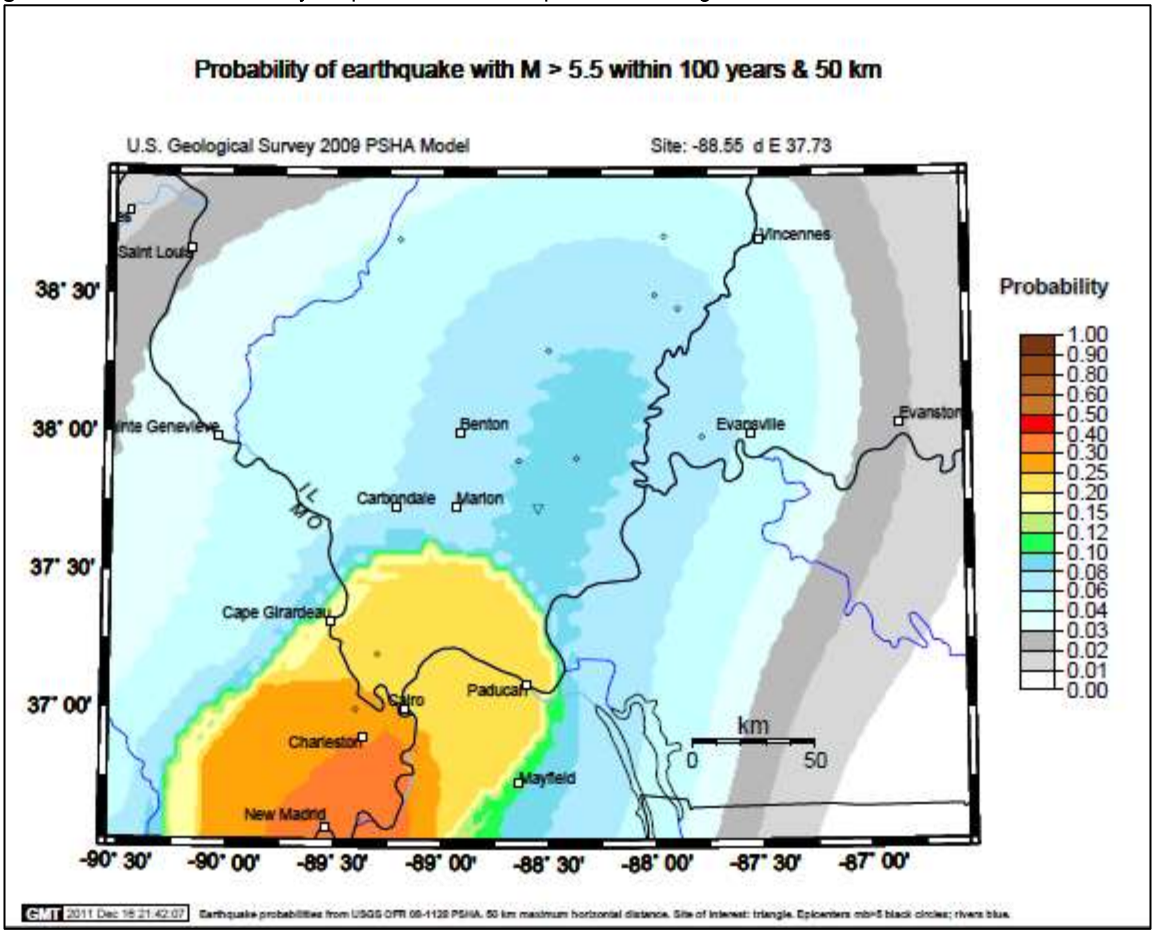


Figure 4-11: USGS Probability Map of a M5.5 Earthquake Occurring in the Next 500 Years within Saline County



Hazard Extent for Earthquake Hazard

Earthquake effects are possible anywhere in Saline County. One of the most critical sources of information that is required for accurate assessment of earthquake risk is soils data. A National Earthquake Hazards Reduction Program (NEHRP) compliant soils and liquefaction maps were used for the analyses. These maps were compiled by the Illinois State Geological Survey (ISGS; Bauer, R. and Su W., 2007a,b).

Risk Identification for Earthquake Hazard

Based on historical information as well as current USGS and SIUC research and studies, future earthquakes in Saline County are possible, especially with the county's geographic location to the New Madrid Seismic Zone, Wabash Valley Fault Zone and the Cottage Grove Fault Zone. According to the Saline County planning team's assessment, earthquake is ranked as the number five hazard.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
1	x	8	=	8

Vulnerability Analysis for Earthquake Hazard

Earthquakes could impact the entire jurisdiction equally; therefore, the entire county's population and all buildings are vulnerable to an earthquake. To accommodate this risk, this plan will consider all buildings located within the county as vulnerable.

Critical Facilities

All critical facilities are vulnerable to earthquakes. A critical facility would encounter many of the same impacts as any other building within the county. These impacts include structural failure and loss of facility functionality (e.g., a damaged police station will no longer be able to serve the community). A map and list of all critical facilities is included as Appendices E and F.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is listed in Table 4-10. The buildings within the county can expect similar impacts to those discussed for critical facilities. These impacts include structural failure and loss of building function which could result in indirect impacts (e.g., damaged homes will no longer be habitable causing residents to seek shelter).

Infrastructure

During an earthquake, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since an extensive inventory of the infrastructure is not available to this plan, it is important to emphasize that any number of these items could become damaged in the event of an earthquake. The impacts to these items include broken, failed, or impassable roadways, broken or failed utility lines (e.g., loss of power or gas to community), and railway failure from broken or impassable railways. Bridges could also fail or become impassable causing traffic risks. Typical scenarios are described to gauge the anticipated impacts of earthquakes in the county in terms of numbers and types of buildings and infrastructure.

Hazus-MH Analyses for Three Earthquake Scenarios

The SIUC-Polis team reviewed existing geological information and recommendations for earthquake scenarios. The earthquake risk assessment included one probability scenario and three deterministic scenarios. These earthquake scenarios were selected to represent the likely for a worst case scenario for each of the fault systems.

The following earthquake hazard modeling scenarios were performed:

- Magnitude 5.0 – 500-year probability in Saline County (probability)
- Magnitude 5.5 along the Cottage Grove Fault Zone (deterministic)
- Magnitude 7.1 along the Wabash Valley Fault Zone (deterministic)
- Magnitude 7.7 along the New Madrid Seismic Zone (deterministic)

One of the most critical sources of information required for accurate assessment of earthquake risk is soils data. Fortunately, a National Earthquake Hazards Reduction Program (NEHRP) soil classification map exists for Illinois. NEHRP soil classifications portray the degree of shear-wave amplification that can occur during ground shaking. The soils map and liquefaction potential map (Bauer and Su, 2007a, 2007b) used in these analyses were provided by the ISGS.

Earthquake hypocenter depths in Illinois range from less than 1.0 to ~25.0 km. The average hypocenter depth, ~10.0 km, was used for the deterministic earthquake scenario. For this scenario type, Hazus-MH also requires the user to define an attenuation function. To maintain consistency with the USGS (2006) modeling of strong ground motion in the central United States, the Toro et al. (1997) attenuation function was used for the deterministic earthquake scenario.

Building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

Results for 500-year probability 5.0 Magnitude Scenario – General Building Stock

The results of the 5.0 magnitude 500-year probability earthquake scenario are shown in Tables 4-22 and 4-23 and Figure 4-12. Hazus-MH estimates that approximately 2,394 buildings will be at least moderately damaged. This is more than 22% of the total number of buildings in the region. It is estimated that 184 buildings will be damaged beyond repair.

Figure 4-12: 5.0 Magnitude 500-Year Probability Earthquake Scenario for Saline County

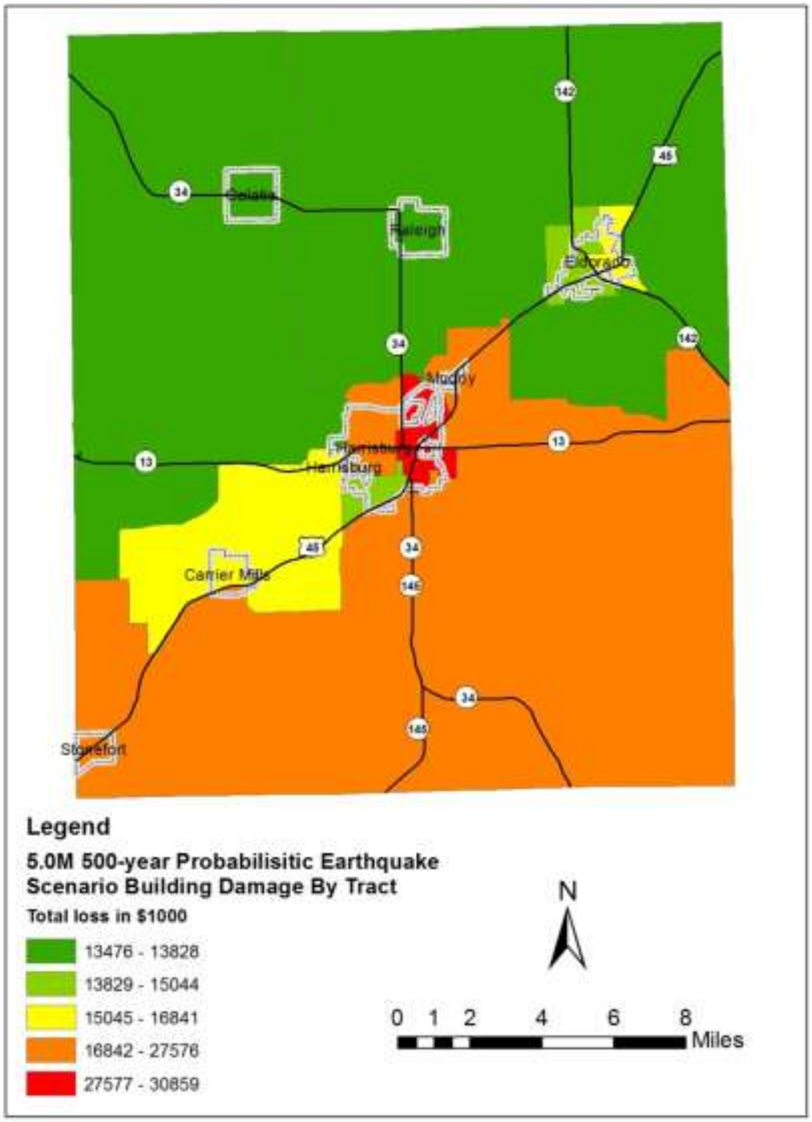


Table 4-22: Building Occupancy for a 5.0 Magnitude 500-Year Probability Earthquake Damage Estimates in Saline County, IL

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	33	0.40	21	0.58	28	1.18	15	1.77	3	1.67
Commercial	229	2.81	163	4.40	180	7.52	79	9.46	17	9.45
Education	8	0.10	5	0.14	6	0.24	2	0.28	1	0.33
Government	11	0.14	7	0.19	8	0.34	3	0.36	1	0.42
Industrial	54	0.67	38	1.02	45	1.89	21	2.56	5	2.46
Other Residential	1,974	24.23	1,048	28.25	967	40.37	395	47.53	75	40.67
Religion	39	0.48	20	0.55	19	0.80	9	1.08	2	1.18
Single Family	5,798	71.18	2,407	64.88	1,141	47.66	307	36.96	81	43.83
Total	8,146		3,711		2,394		831		184	

Table 4-23: Building Economic Losses (in Millions of Dollars) for a 5.0 Magnitude 500-Year Probability Earthquake Estimates in Saline County, IL

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.69	7.28	0.19	0.70	8.86
	Capital-Related	0.00	0.29	5.46	0.12	0.24	6.12
	Rental	2.04	1.68	3.32	0.07	0.39	7.51
	Relocation	7.50	2.45	5.67	0.40	3.30	19.32
	Subtotal	9.54	5.12	21.72	0.80	4.62	41.81
Capital Stock Losses							
	Structural	10.15	5.11	6.81	1.08	2.88	26.03
	Non_Structural	35.07	15.60	15.30	2.77	7.23	75.96
	Content	11.94	3.48	7.65	1.78	3.90	28.76
	Inventory	0.00	0.00	0.28	0.36	0.07	0.71
	Subtotal	57.16	24.19	30.04	5.98	14.09	131.46
	Total	66.70	29.31	51.76	6.78	18.71	173.26

Total building-related losses totaled $173.26 million; 24% of the estimated losses were related to the business interruption. By far, the largest loss was sustained by residential occupancies, which comprised more than 55% of the total loss.

Results for 500-year probability 5.0 Magnitude Scenario – Essential Facilities

Before the earthquake, the region had 116 care beds available for use. On the day of the earthquake, the model estimates that only 30 care beds (26%) are available for use by patients already in medical care facilities and those injured by the earthquake. After one week, 41% of the beds will be back in service. By day 30, 71% will be operational.

Results for 5.5 Magnitude Cottage Grove Fault Scenario– General Building Stock

The results of the 5.5 magnitude earthquake scenario, with an epicenter along the Cottage Grove Fault Zone in north of Harrisburg, are shown in Tables 4-24 and 4-25 and Figure 4-12. Hazus-MH estimates that approximately 2,235 buildings will be at least moderately damaged. This is more than 10% of the total number of buildings in the region. It is estimated that 147 buildings will be damaged beyond repair.

Figure 4-12: 5.5 Magnitude Earthquake Scenario for Saline County

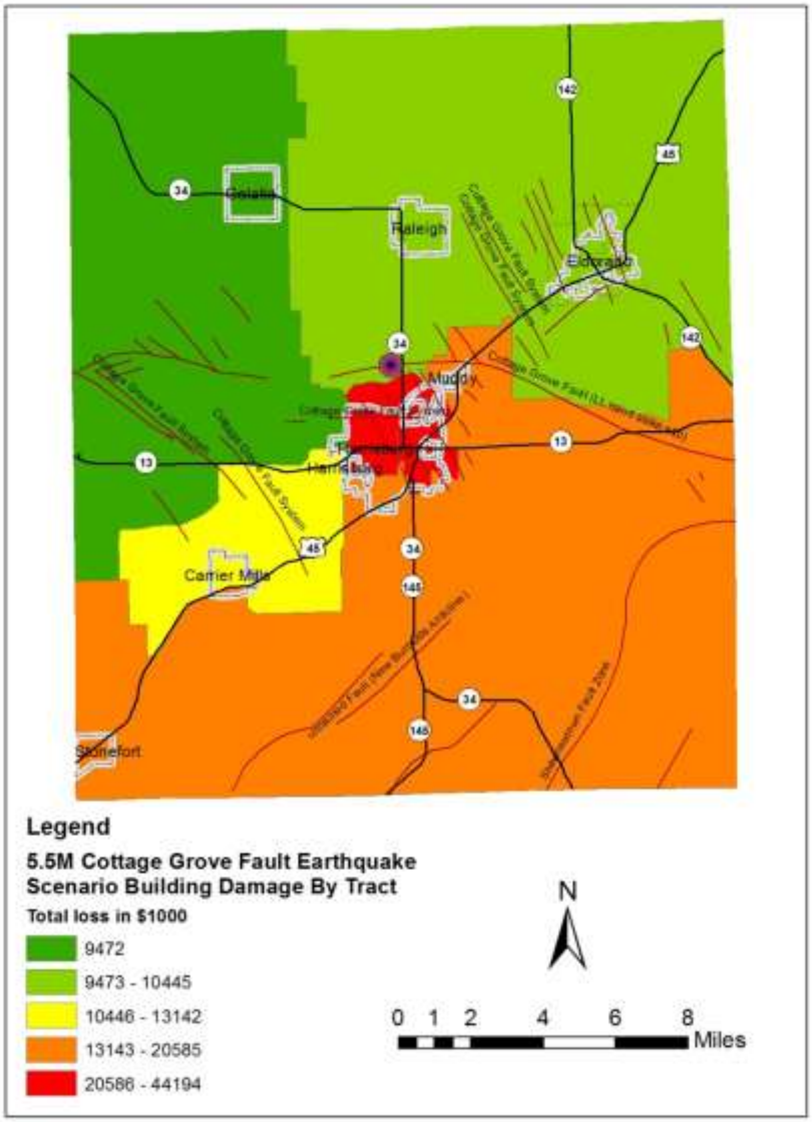


Table 4-24: Building Occupancy for a 5.5 Magnitude Damage Estimates in Saline County, IL

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	48	0.56	21	0.56	21	0.95	9	1.33	2	1.03
Commercial	286	3.35	154	4.17	151	6.77	62	9.55	15	9.86
Education	11	0.13	5	0.13	4	0.20	2	0.25	0	0.30
Government	13	0.16	7	0.18	7	0.31	2	0.37	1	0.47
Industrial	75	0.88	36	0.97	35	1.56	14	2.18	3	1.90
Other Residential	2,199	25.77	1,080	29.19	870	38.93	263	40.23	47	32.14
Religion	42	0.49	20	0.55	18	0.79	8	1.18	2	1.39
Single Family	5,858	68.66	2,378	64.26	1,128	50.49	293	44.91	78	52.92
Total	8,532		3,700		2,235		653		147	

Table 4-25: Building Economic Losses (in Millions of Dollars) for a 5.5 Magnitude Estimates in Saline County, IL

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.84	5.91	0.13	0.53	7.40
	Capital-Related	0.00	0.36	4.49	0.08	0.16	5.09
	Rental	1.98	1.75	2.83	0.05	0.30	6.91
	Relocation	7.28	1.86	4.69	0.30	2.38	16.50
	Subtotal	9.25	4.80	17.92	0.56	3.36	35.91
Capital Stock Losses							
	Structural	9.73	4.52	5.64	0.74	2.14	22.77
	Non_Structural	39.62	17.36	15.93	2.70	6.56	82.17
	Content	16.58	5.01	9.90	1.97	4.49	37.94
	Inventory	0.00	0.00	0.37	0.38	0.07	0.82
	Subtotal	65.93	26.89	31.84	5.79	13.26	143.71
	Total	75.18	31.69	49.76	6.35	16.62	179.61

Total building-related losses totaled $179 million; 19% of the estimated losses were related to the business interruption. By far, the largest loss was sustained by residential occupancies, which comprised more than 59% of the total loss.

Results for 5.5M Cottage Grove Fault Scenario – Essential Facilities

Before the earthquake, the region had 116 care beds available for use. On the day of the earthquake, the model estimates that only 43 care beds (37%) are available for use by patients already in medical care facilities and those injured by the earthquake. After one week, 53% of the beds will be back in service. By day 30, 79% will be operational.

Results for 7.1 Magnitude Wabash Valley Fault Zone Scenario – General Building Stock

The results of the 7.1M WVFZ deterministic analysis are shown in Figure 4-13 and Tables 4-26 and 4-27. Hazus-MH estimates that approximately 6 buildings will be at least moderately damaged. This is less than 1% of the total number of buildings in the region. It is estimated that no buildings will be damaged beyond repair. Building-related losses totaled $5.09 million; 1% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies, which made up more than 56% of the total loss.

Figure 4-13: 7.1M WVFZ Earthquake Scenario for Saline County

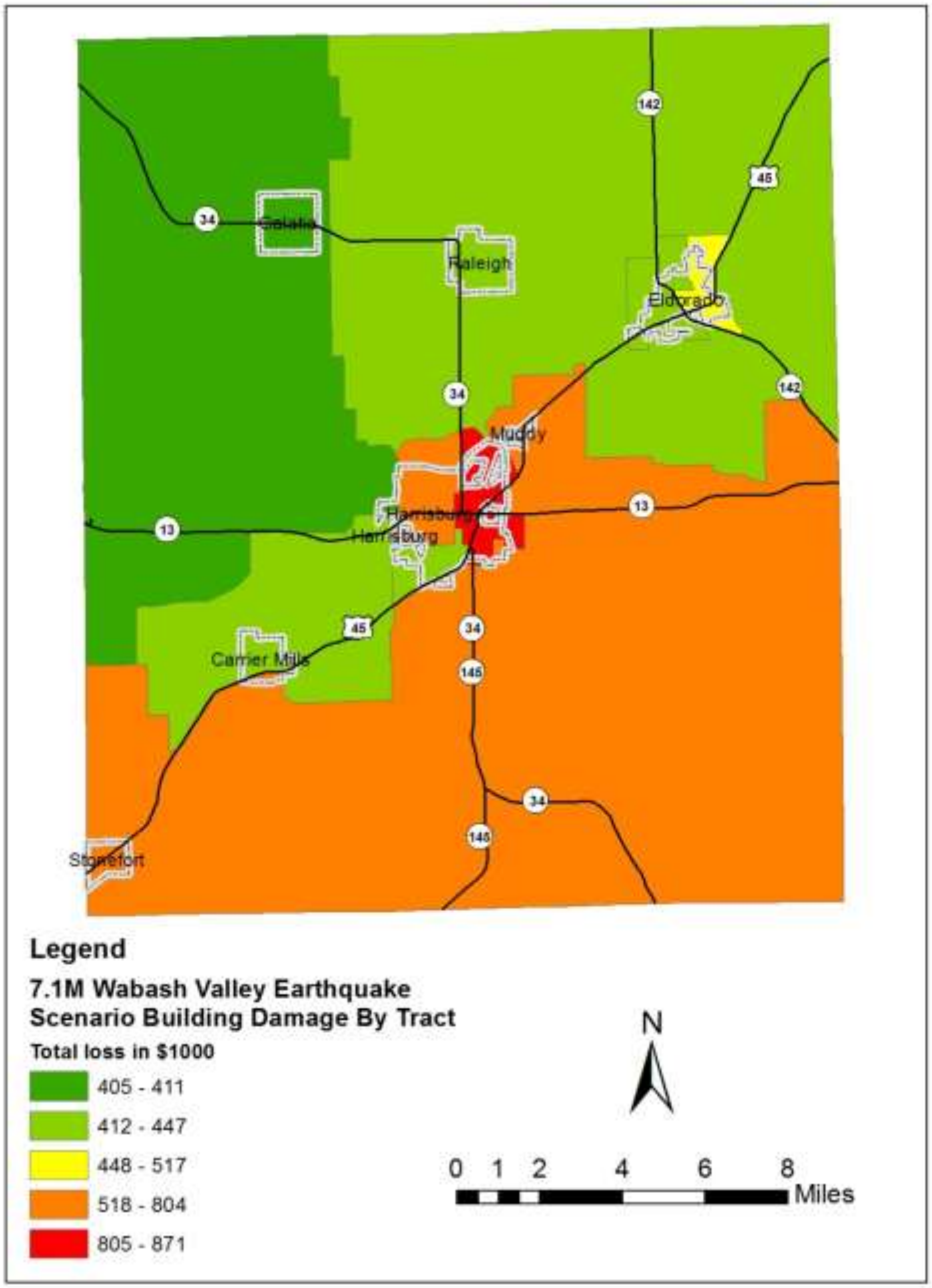


Table 4-26: 7.1M WVFZ Earthquake Damage Estimates by Building Occupancy for Saline County, IL

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	99	0.65	1	1.03	0	1.53	0	0.00	0	0.00
Commercial	661	4.36	7	6.24	1	8.66	0	0.00	0	0.00
Education	22	0.14	0	0.22	0	0.24	0	0.00	0	0.00
Government	30	0.20	0	0.23	0	0.26	0	0.00	0	0.00
Industrial	161	1.06	2	1.52	0	2.23	0	0.00	0	0.00
Other Residential	4,402	29.05	54	49.76	3	44.73	0	0.00	0	0.00
Religion	89	0.59	1	0.87	0	1.10	0	0.00	0	0.00
Single Family	9,689	63.94	43	40.14	3	41.26	0	0.00	0	0.00
Total	15,152		108		7		0		0	

Table 4-27: 7.1M WVFZ Earthquake Estimates of Building Economic Losses (in Millions of Dollars) for Saline County, IL

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.00	0.01	0.00	0.00	0.02
	Capital-Related	0.00	0.00	0.01	0.00	0.00	0.01
	Rental	0.00	0.00	0.01	0.00	0.00	0.02
	Relocation	0.01	0.00	0.01	0.00	0.00	0.02
	Subtotal	**0.01**	**0.01**	**0.04**	**0.00**	**0.01**	**0.07**
Capital Stock Losses							
	Structural	0.03	0.02	0.02	0.00	0.01	0.07
	Non_Structural	1.17	0.53	0.68	0.18	0.26	2.82
	Content	0.84	0.24	0.58	0.14	0.28	2.08
	Inventory	0.00	0.00	0.02	0.03	0.01	0.05
	Subtotal	**2.04**	**0.78**	**1.30**	**0.35**	**0.56**	**5.02**
	Total	**2.05**	**0.79**	**1.34**	**0.35**	**0.56**	**5.09**

Results for 7.1 Magnitude Wabash Valley Fault Zone Scenario – Essential Facilities

Before the earthquake, the region had 116 care beds available for use. On the day of the earthquake, the model estimates that only 114 care beds (98%) are available for use by patients already in medical care facilities and those injured by the earthquake. After one week, 100% of the beds will be back in service.

Results for 7.1 Magnitude New Madrid Seismic Zone Scenario – General Building Stock

The results of the 7.7M NMSZ deterministic analysis are shown in Figure 4-14 and Tables 4-28 and 4-29. Hazus-MH estimates that approximately 802 buildings will be at least moderately damaged. This is more than 5% of the total number of buildings in the region. It is estimated that 0 buildings will be damaged beyond repair. Building-related losses totaled $45.67 million; 14% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies, which made up more than 56% of the total loss.

Figure 4-14: 7.7M NMSZ Earthquake Scenario for Saline County

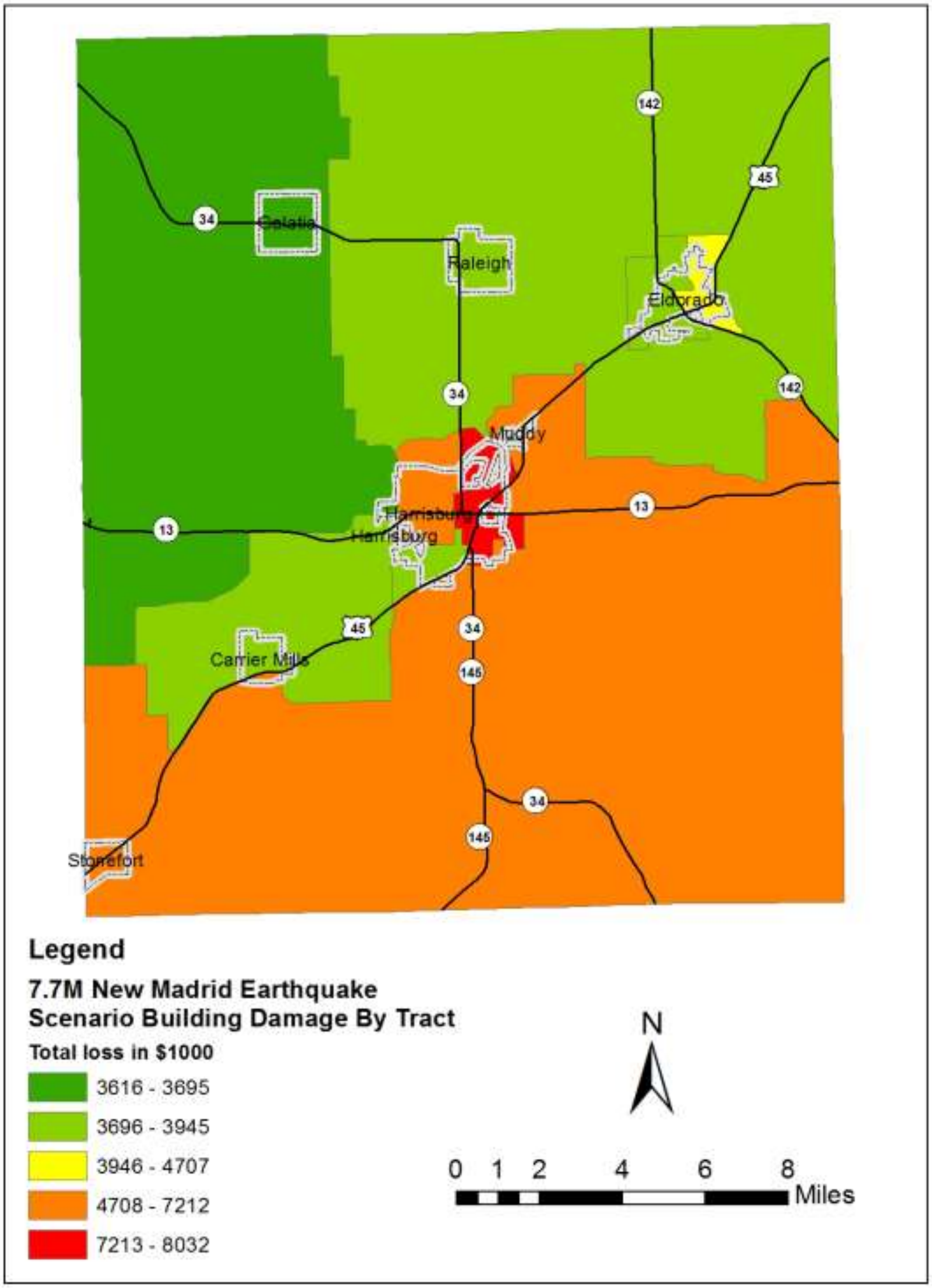


Table 4-28: 7.7M NMSZ Earthquake Damage Estimates by Building Occupancy for Saline County, IL

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	60	0.50	26	1.09	13	1.64	1	3.02	0	2.11
Commercial	427	3.54	170	7.09	66	8.56	5	15.52	0	12.25
Education	15	0.12	5	0.22	2	0.23	0	0.22	0	0.34
Government	20	0.17	7	0.29	2	0.31	0	0.30	0	0.35
Industrial	102	0.84	42	1.74	18	2.37	1	4.46	0	3.10
Other Residential	2,998	24.84	971	40.57	475	61.44	15	48.51	0	18.93
Religion	64	0.53	19	0.79	7	0.91	0	1.41	0	1.58
Single Family	8,383	69.46	1,154	48.21	190	24.53	8	26.56	0	61.34
Total	**12,070**		**2,394**		**773**		**30**		**0**	

Table 4-29: 7.7M NMSZ Earthquake Estimates of Building Economic Losses (in Millions of Dollars) for Saline County, IL

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.04	1.25	0.04	0.12	1.45
	Capital-Related	0.00	0.02	0.96	0.02	0.04	1.04
	Rental	0.20	0.24	0.68	0.02	0.05	1.20
	Relocation	0.70	0.62	1.04	0.10	0.41	2.88
	Subtotal	**0.90**	**0.92**	**3.94**	**0.17**	**0.62**	**6.56**
Capital Stock Losses							
	Structural	1.21	0.97	1.08	0.19	0.40	3.85
	Non_Structural	9.62	4.37	4.51	1.03	1.90	21.43
	Content	6.07	1.57	3.40	0.75	1.72	13.52
	Inventory	0.00	0.00	0.13	0.15	0.03	0.31
	Subtotal	**16.90**	**6.91**	**9.12**	**2.12**	**4.05**	**39.11**
	Total	**17.81**	**7.84**	**13.06**	**2.30**	**4.67**	**45.67**

Results for 7.1 Magnitude New Madrid Seismic Zone Scenario- Essential Facilities

Before the earthquake, the region had 116 care beds available for use. On the day of the earthquake, the model estimates that only 55 care beds (48%) are available for use by patients already in medical care facilities and those injured by the earthquake. After one week, 74% of the beds will be back in service. By day 30, 98% will be operational.

Vulnerability to Future Assets/Infrastructure for Earthquake Hazard

New construction, especially critical facilities, should accommodate earthquake mitigation design standards.

Suggestions for Community Development Trends

Community development will occur outside of the low-lying areas in floodplains with a water table within five feet of grade that is susceptible to liquefaction.

In Meeting #4, the MHMP team discussed specific mitigation strategies for reducing earthquake hazard. The discussion included strategies to harden and protect future, as well as existing, structures against the possible termination of public services and systems including power lines, water and sanitary lines, and public communication.

4.4.4 Thunderstorm Hazard

Hazard Definition – Thunderstorm

Severe thunderstorms are defined as thunderstorms with one or more of the following characteristics: strong winds, large damaging hail, or frequent lightning. Severe thunderstorms most frequently occur in Illinois during the spring and summer months, but can occur any month of the year at any time of day. A severe thunderstorm's impacts can be localized or can be widespread in nature. A thunderstorm is classified as severe when it meets one or more of the following criteria.

- Hail of diameter 0.75 inches or higher
- Frequent and dangerous lightning
- Wind speeds equal to or greater than 58 miles per hour

Hail

Hail can be a product of a strong thunderstorm. Hail usually falls near the center of a storm, however strong winds occurring at high altitudes in the thunderstorm can blow the hailstones away from the storm center, resulting in damage in other areas near the storm. Hailstones range from pea-sized to baseball-sized, and hailstones larger than softballs have been reported on rare occasions.

Lightning

Lightning is a discharge of electricity from a thunderstorm. Lightning is often perceived as a minor hazard, but in reality lightning causes damage to many structures and kills or severely injures numerous people in the United States each year.

Severe Winds (Straight-Line Winds)

Straight-line winds from thunderstorms are a fairly common occurrence across Illinois. Straight-line winds can cause damage to homes, businesses, power lines, and agricultural areas, and may require temporary sheltering of individuals who are without power for extended periods of time.

Previous Occurrences for Thunderstorm Hazard

The NCDC database reported 44 hail storms in Saline County since 1984. These storms attribute to $30,000 in property damage. Hail storms occur nearly every year in the late spring and early summer months. The most recent reported occurrence was in June 2011 when large storm systems moved through southern Illinois with approximately nickel-sized hail.

The Saline County NCDC data recorded over 40 reports of significant hail storms. Only one event caused serious damage, totaling over $30,000 (listed in Table 4-30). Additional details of individual hazard events can be found on the NCDC website.

Table 4-30: NCDC-Recorded Hail Storms for Saline County, IL

Location or County*	Date	Magnitude	Deaths	Injuries	Property Damage (x $1000)	Crop Damage (x$1000)
West End	6/8/1995	2.00 in.	0	0	30	0
		Total	0	0	$30	0

*NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

The NCDC database reported no occurrences of significant lightning strikes in Saline County since 1957.

The NCDC database identified 113 wind storms reported since 1957, the most recent of which was reported in May 2011 when a strong front moved across the United States. A funnel cloud was reported in Saline County, but damage during the storm was from the strong winds. The total property damage related to wind storms is $9.5 million.

As shown in Table 4-31, wind storms occurred year-round with the greatest frequency and damage between May and July. The following table includes available top wind speeds for Saline County.

Table 4-31: NCDC-Recorded Wind Storms with damage, injuries, or deaths for Saline County, IL

Location or County*	Date	Type	Magnitude	Deaths	Injuries	Property Damage (x$1000)	Crop Damage (x$1000)
Saline	3/19/1996	High Wind	50 kts.	0	0	5	0
Saline	10/22/1996	High Wind	0 kts.	0	0	28	0
Saline	4/30/1997	High Wind	52 kts.	0	0	20	0
Saline	9/14/2008	High Wind	56 kts.	0	0	2,200	2,000
Saline	11/29/2001	Strong Wind	0 kts.	0	1	10	0
Saline	1/8/2006	Strong Wind	28 kts.	0	0	19	0
Saline	1/19/2006	Strong Wind	28 kts.	0	0	19	0
Saline	2/16/2006	Strong Wind	43 kts.	0	0	14	0
Saline	12/1/2006	Strong Wind	28 kts.	0	0	1	0
Saline	4/11/2007	Strong Wind	40 kts.	0	0	1	0
Saline	12/22/2007	Strong Wind	44 kts.	0	0	20	0
Saline	5/11/2008	Strong Wind	43 kts.	0	0	1	0
Saline	12/19/2008	Strong Wind	39 kts.	0	0	1	0
Saline	4/6/2010	Strong Wind	39 kts.	0	0	1	0
Saline	3/23/2011	Strong Wind	43 kts.	0	0	1	0
Harrisburg	3/30/2007	Thunderstorm Wind	52 kts.	0	0	4	0

Location or County*	Date	Type	Magnitude	Deaths	Injuries	Property Damage (x$1000)	Crop Damage (x$1000)
Galatia	6/8/2007	Thunderstorm Wind	70 kts.	0	0	125	0
Harrisburg	6/18/2007	Thunderstorm Wind	50 kts.	0	0	5	0
Harrisburg	6/26/2007	Thunderstorm Wind	50 kts.	0	0	5	0
Harrisburg	6/27/2007	Thunderstorm Wind	50 kts.	0	0	3	0
Harrisburg	8/3/2007	Thunderstorm Wind	65 kts.	0	0	150	0
Eldorado	1/29/2008	Thunderstorm Wind	65 kts.	0	0	200	0
CarriersMills	6/9/2008	Thunderstorm Wind	52 kts.	0	0	20	0
Harrisburg	6/27/2008	Thunderstorm Wind	50 kts.	0	0	10	0
Harrisburg	12/27/2008	Thunderstorm Wind	65 kts.	0	0	50	0
Newhope	5/8/2009	Thunderstorm Wind	78 kts.	0	0	4500	0
Harrisburg	5/14/2009	Thunderstorm Wind	83 kts.	0	0	400	0
CarriersMills	8/4/2009	Thunderstorm Wind	52 kts.	0	0	40	0
CarriersMills	5/26/2010	Thunderstorm Wind	56 kts.	0	0	8	0
Galatia	6/15/2010	Thunderstorm Wind	52 kts.	0	0	3	0
Harrisburg	10/26/2010	Thunderstorm Wind	50 kts.	0	0	4	0
Harrisburg	4/19/2011	Thunderstorm Wind	61 kts.	0	0	100	0
BeulahHgts	4/19/2011	Thunderstorm Wind	70 kts.	0	0	250	0
Ingrams	5/23/2011	Thunderstorm Wind	52 kts.	0	0	3	0
Eldorado	5/23/2011	Thunderstorm Wind	56 kts.	0	0	50	0
CarriersMills	5/25/2011	Thunderstorm Wind	52 kts.	0	0	20	0
Harrisburg	5/25/2011	Thunderstorm Wind	70 kts.	0	0	80	0

Location or County*	Date	Type	Magnitude	Deaths	Injuries	Property Damage (x$1000)	Crop Damage (x$1000)
Eldorado	5/25/2011	Thunderstorm Wind	56 kts.	0	0	100	0
Raleigh	1/18/1996	Thunderstorm Wind	0 kts.	0	0	20	0
Harrisburg	7/14/1997	Thunderstorm Wind	50 kts.	0	0	5	0
Galatia	7/19/1997	Thunderstorm Wind	50 kts.	0	0	3	0
Harrisburg	5/21/1998	Thunderstorm Wind	50 kts.	0	0	5	0
CarriersMills	6/21/1998	Thunderstorm Wind	55 kts.	0	0	5	0
Harrisburg	6/21/1998	Thunderstorm Wind	87 kts.	0	0	100	0
Rudement	1/21/1999	Thunderstorm Wind	0 kts.	0	0	3	0
Harrisburg	2/27/1999	Thunderstorm Wind	70 kts.	0	0	100	0
Saline	5/17/1999	Thunderstorm Wind	0 kts.	0	0	20	0
Harrisburg	6/4/1999	Thunderstorm Wind	50 kts.	0	0	6	0
Stonefort	6/4/1999	Thunderstorm Wind	0 kts.	0	0	8	0
Harrisburg	5/12/2000	Thunderstorm Wind	69 kts.	0	0	40	0
Saline	7/18/2000	Thunderstorm Wind	52 kts.	0	0	5	0
Eldorado	8/26/2000	Thunderstorm Wind	52 kts.	0	0	5	0
Saline	9/20/2000	Thunderstorm Wind	50 kts.	0	0	2	0
Saline	7/18/2001	Thunderstorm Wind	52 kts.	0	0	10	0
Harco	10/24/2001	Thunderstorm Wind	50 kts.	0	0	2	0
Eldorado	7/21/2002	Thunderstorm Wind	55 kts.	0	0	25	0
Saline	5/30/2004	Thunderstorm Wind	70 kts.	0	0	310	0
Harrisburg	8/14/2005	Thunderstorm Wind	50 kts.	0	0	40	0

Location or County*	Date	Type	Magnitude	Deaths	Injuries	Property Damage (x$1000)	Crop Damage (x$1000)
Harrisburg	11/15/2005	Thunderstorm Wind	65 kts.	0	0	200	0
Harrisburg	3/13/2006	Thunderstorm Wind	52 kts.	0	0	1	0
Harrisburg	4/2/2006	Thunderstorm Wind	56 kts.	0	0	4	0
Saline	7/21/2006	Thunderstorm Wind	52 kts.	0	0	30	0
Harrisburg	8/10/2006	Thunderstorm Wind	52 kts.	0	0	1	0
HarrisburgAnd	4/15/1994	Thunderstorm Wind	0 kts.	0	0	5	0
Saline	6/7/1995	Thunderstorm Wind	0 kts.	0	0	50	0
Saline	6/8/1995	Thunderstorm Wind	52 kts.	0	0	0	0
CarrierMills	11/10/1995	Thunderstorm Wind	52 kts.	0	0	2	0
Saline	4/20/2000	Wind	N/A	0	0	0	0
Saline	3/9/2002	Wind	N/A	0	0	3	0
Saline	3/19/1996	High Wind	50 kts.	0	0	5	0
Saline	10/22/1996	High Wind	0 kts.	0	0	28	0
Saline	4/30/1997	High Wind	52 kts.	0	0	20	0
Saline	9/14/2008	High Wind	56 kts.	0	0	2200	2000
Saline	11/29/2001	Strong Wind	0 kts.	0	1	10	0
Saline	1/8/2006	Strong Wind	28 kts.	0	0	19	0
Saline	1/19/2006	Strong Wind	28 kts.	0	0	19	0
Saline	2/16/2006	Strong Wind	43 kts.	0	0	14	0
Saline	12/1/2006	Strong Wind	28 kts.	0	0	1	0
Saline	4/11/2007	Strong Wind	40 kts.	0	0	1	0
Saline	12/22/2007	Strong Wind	44 kts.	0	0	20	0
Saline	5/11/2008	Strong Wind	43 kts.	0	0	1	0
Saline	12/19/2008	Strong Wind	39 kts.	0	0	1	0
Saline	4/6/2010	Strong Wind	39 kts.	0	0	1	0
Saline	3/23/2011	Strong Wind	43 kts.	0	0	1	0
Harrisburg	3/30/2007	Thunderstorm Wind	52 kts.	0	0	4	0
Galatia	6/8/2007	Thunderstorm Wind	70 kts.	0	0	125	0
Harrisburg	6/18/2007	Thunderstorm Wind	50 kts.	0	0	5	0

Location or County*	Date	Type	Magnitude	Deaths	Injuries	Property Damage (x$1000)	Crop Damage (x$1000)
Harrisburg	6/26/2007	Thunderstorm Wind	50 kts.	0	0	5	0
Harrisburg	6/27/2007	Thunderstorm Wind	50 kts.	0	0	3	0
Harrisburg	8/3/2007	Thunderstorm Wind	65 kts.	0	0	150	0
Eldorado	1/29/2008	Thunderstorm Wind	65 kts.	0	0	200	0
CarriersMills	6/9/2008	Thunderstorm Wind	52 kts.	0	0	20	0
Harrisburg	6/27/2008	Thunderstorm Wind	50 kts.	0	0	10	0
Harrisburg	12/27/2008	Thunderstorm Wind	65 kts.	0	0	50	0
Newhope	5/8/2009	Thunderstorm Wind	78 kts.	0	0	4500	0
Harrisburg	5/14/2009	Thunderstorm Wind	83 kts.	0	0	400	0
CarriersMills	8/4/2009	Thunderstorm Wind	52 kts.	0	0	40	0
CarriersMills	5/26/2010	Thunderstorm Wind	56 kts.	0	0	8	0
Galatia	6/15/2010	Thunderstorm Wind	52 kts.	0	0	3	0
Harrisburg	10/26/2010	Thunderstorm Wind	50 kts.	0	0	4	0
Harrisburg	4/19/2011	Thunderstorm Wind	61 kts.	0	0	100	0
BeulahHgts	4/19/2011	Thunderstorm Wind	70 kts.	0	0	250	0
Ingrams	5/23/2011	Thunderstorm Wind	52 kts.	0	0	3	0
Eldorado	5/23/2011	Thunderstorm Wind	56 kts.	0	0	50	0
CarriersMills	5/25/2011	Thunderstorm Wind	52 kts.	0	0	20	0
Harrisburg	5/25/2011	Thunderstorm Wind	70 kts.	0	0	80	0
Eldorado	5/25/2011	Thunderstorm Wind	56 kts.	0	0	100	0
Total				0	1	$9,481	$2,000

*NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

Geographic Location of Thunderstorm Hazard

The entire county has the same risk for occurrence of thunderstorms. They can occur at any location within the county.

Hazard Extent for Thunderstorm Hazard

The extent of the historical thunderstorms depends upon the extent of the storm, the wind speed, and the size of hail stones. Thunderstorms can occur at any location within the county.

Risk Identification for Thunderstorm Hazard

Based on historical information, the occurrence of future high winds, hail, and lightning is highly likely. High winds with widely varying magnitudes are expected to happen. According to the RPI, thunderstorms and high wind damage ranked as the number one hazard.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
4	x	2	=	8

Vulnerability Analysis for Thunderstorm Hazard

Severe thunderstorms are equally distributed; therefore, the entire county's population and all buildings are vulnerable to a severe thunderstorm and can expect the same impacts within the affected area. This plan will therefore consider all buildings located within the county as vulnerable. The existing buildings and infrastructure in Saline County are discussed in Table 4-8 and 4-9.

Critical Facilities

All critical facilities are vulnerable to severe thunderstorms. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts include structural failure, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, fires caused by lightning, and loss of building functionality (e.g., a damaged police station will no longer be able to serve the community). Table 4-8 lists the types and numbers of all of the essential facilities in the area. A map and list of all critical facilities are included as Appendices E and F.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is provided in Table 4-9. The buildings within the county can expect impacts similar to those discussed for critical facilities. These impacts include structural failure, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, fires caused by lightning, and loss of building functionality (e.g., a damaged home will no longer be habitable causing residents to seek shelter).

Infrastructure

During a severe thunderstorm, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is vulnerable, it is important to emphasize that any number of these structures could become damaged during a severe thunderstorm. The impacts to these structures include broken, failed, or impassable roadways; broken or failed utility lines (e.g., loss of power or gas to community); or impassable railways. Bridges could become impassable causing risk to traffic.

Potential Dollar Losses for Thunderstorm Hazard

To determine dollar losses for a thunderstorm hazard, the available NCDC hazard information was condensed to include only thunderstorm hazards that occurred within the past ten years. Saline County's mitigation planning team then reviewed the property damages reported to NCDC and made any applicable updates.

Vulnerability to Future Assets/Infrastructure for Thunderstorm Hazard

All future development within the county and all communities will remain vulnerable to these events.

Suggestions for Community Development Trends

Preparing for severe storms will be enhanced if officials sponsor a wide range of programs and initiatives to address the overall safety of county residents. New structures need to be built with more sturdy construction, and those structures already in place need to be hardened to lessen the potential impacts of severe weather. Community warning sirens to provide warning of approaching storms are also vital to ensuring the safety of Saline County residents.

4.4.5 Winter Storm Hazard

Hazard Definition of Winter Storm Hazard

Severe winter weather consists of various forms of precipitation and weather conditions. This may include one or more of the following: freezing rain, sleet, heavy snow, blizzards, icy roadways, extreme low temperatures, and strong winds. These conditions can cause human health risks such as frostbite, hypothermia, and death. In addition severe winter storms can also cause property damage and disrupt economic activity.

Ice (Glazing) and Sleet Storms

Ice or sleet, even in small quantities, can result in hazardous driving conditions and can cause property damage. Sleet involves raindrops that freeze completely before reaching the ground.. Sleet does not stick to trees and wires. Ice storms, on the other hand, involve liquid rain that falls through subfreezing air and/or onto sub-freezing surfaces, freezing on contact with those surfaces. The ice coats trees, buildings, overhead wires, and roadways, sometimes causing extensive damage.

Some of the most damaging winter storms in Illinois have been ice storms. Ice storms occur when moisture-laden Gulf air converges with the northern jet stream causing freezing rain that coats power and communication lines and trees with heavy ice. Strong winds can cause the overburdened limbs and cables to snap; leaving large sectors of the population without power, heat, or communication.

Snow Storms

Significant snowstorms are characterized by the rapid accumulation of snow, often accompanied by high winds, cold temperatures, and low visibility. A blizzard is categorized as a snowstorm with winds of 35 miles per hour or greater and/or visibility of less than one-quarter mile for three or more hours. Strong winds during a blizzard blow falling and already existing snow, creating poor visibility and impassable roadways. Blizzards can potential to result in property damage.

Illinois has repeatedly been struck by blizzards. Blizzard conditions cause power outages, loss of communication, and make transportation difficult. The blowing of snow can reduce visibility to less than one-quarter mile, and the resulting disorientation makes even travel by foot dangerous if not deadly.

Severe Cold

Severe cold involves ambient air temperatures that drop to around 0˚F or below. These extreme temperatures can increase the likelihood of frostbite and hypothermia. High winds during severe cold events can enhance the air temperature’s effects. Fast winds during cold weather events can lower the wind chill factor (how cold the air feels on your skin). As a result, the time it takes for frostbite and hypothermia to affect a person’s body will decrease.

Previous Occurrences of Winter Storm Hazard

The NCDC database identified 72 winter storm and extreme cold events for Saline County since 1994. These events attribute to $750,000 in property damage The most recent reported event occurred in February 2011 when snow and ice closed several major roads.

The NCDC winter storms that caused significant losses are listed in Table 4-32. Additional details of individual hazard events can be found on the NCDC website.

Table 4-32: NCDC-Recorded Winter Storm Events with property damage, injuries, or casualties for Saline County, IL

Location or County	Date	Type	Deaths	Injuries	Property Damage ($)
Saline	3/8/1994	Heavy Snow	0	0	500,000
Saline	1/10/1997	Extreme Windchill	1	0	0
Saline	1/1/1999	Ice Storm	0	0	150,000
Saline	12/22/2004	Winter Storm	1	1	100,000
		Total	3	1	$750,000

*NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

Geographic Location of Winter Storm Hazard

Severe winter storms are regional in nature. Most of the NCDC data are calculated regionally or in some cases statewide.

Hazard Extent of Winter Storm Hazard

The extent of the historical winter storms varies in terms of storm location, temperature, and ice or snowfall. A severe winter storm can occur anywhere in the jurisdiction.

Risk Identification of Winter Storm Hazard

Based on historical information and input from the planning team, the occurrence of future winter storms is likely. Winter storms of varying magnitudes are expected to happen. According to the RPI, winter storms were ranked as the number nine hazard.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
2	x	2	=	4

Vulnerability Analysis of Winter Storm Hazard

Winter storm impacts are equally likely across the entire jurisdiction; therefore, the entire county is vulnerable to a winter storm and can expect impacts within the affected area. The building exposure for Saline County, as determined from the building inventory, is included in Table 4-9.

Critical Facilities

All critical facilities are vulnerable to a winter storm. A critical facility will encounter many of the same impacts as other buildings within the jurisdiction. These impacts include loss of gas or electricity from broken or damaged utility lines, damaged or impassable roads and railways, broken water pipes, and roof collapse from heavy snow. Table 4-8 lists the types and numbers of the essential facilities in the area. A map and list of all critical facilities are included as Appendices E and F.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is listed in Table 4-10. The impacts to the general buildings within the county are similar to the damages expected to the critical facilities. These include loss of gas or electricity from broken or damaged utility lines, damaged or impassable roads and railways, broken water pipes, and roof collapse from heavy snow.

Infrastructure

During a winter storm, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is vulnerable, it is important to emphasize that any structures could be impacted by a winter storm. Potential impacts include broken gas and/or electricity lines or damaged utility lines, damaged or impassable roads and railways, and broken water pipes.

Potential Dollar Losses for Winter Storm Hazard

To determine dollar losses for a winter storm hazard, the available NCDC hazard information was condensed to include only winter storm hazards that occurred within the past ten years. Saline County's mitigation planning team then reviewed the property damages reported to NCDC and made any applicable updates.

Vulnerability to Future Assets/Infrastructure for Winter Storm Hazard

Any new development within the county will remain vulnerable to these events.

Suggestions for Community Development Trends

Because the winter storm events are regional in nature, future development across the county will also face winter storms.

4.4.6 Hazardous Materials Storage and Transportation Hazard

Hazard Definition

Illinois has numerous active transportation lines that run through many of its counties. Active railways transport harmful and volatile substances between our borders every day. The transportation of chemicals and substances along interstate routes is commonplace in Illinois. The rural areas of Illinois have considerable agricultural commerce, creating demand for fertilizers, herbicides, and pesticides to be transported along rural roads. These factors increase the chance of hazardous material releases and spills throughout the state of Illinois.

The release or spill of certain substances can cause an explosion. Explosions result from the ignition of volatile products such as petroleum products, natural and other flammable gases, hazardous materials/chemicals, dust, and bombs. An explosion can potentially cause death, injury, and property damage. In addition, a fire routinely follows an explosion, which may cause further damage and inhibit emergency response. Emergency response may require fire, safety/law enforcement, search and rescue, and hazardous materials units.

Previous Occurrences of Hazardous Materials Storage and Transportation Hazard

Saline County has not experienced a significantly large-scale hazardous material incident at a fixed site or during transport resulting in multiple deaths or serious injuries, although there have been minor releases that have put local firefighters, hazardous materials teams, emergency management, and local law enforcement into action to try to stabilize these incidents and prevent or lessen harm to Saline County residents.

Geographic Location of Hazardous Materials Storage and Transportation Hazard

Hazardous material hazards are countywide and are primarily associated with the transport of materials via highway, and/or railroad.

Hazard Extent of Hazardous Materials Storage and Transportation Hazard

The extent of the hazardous material hazard varies both in terms of the quantity of material being transported as well as the specific content of the container.

Risk Identification of Hazardous Materials Storage and Transportation Hazard

Based on input from the planning team, the occurrence of a hazardous materials accident is likely. According to the RPI, "hazardous materials storage and transport" ranked as the number six hazard in Saline County.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
2	x	4	=	8

Vulnerability Analysis for Hazardous Materials Storage and Transportation Hazard

The entire county is vulnerable to a hazardous material release and can expect impacts within the affected area. The main concern during a release or spill is the population affected. The building exposure for Saline County, as determined from building inventory, is included in Table 4-9. This plan will therefore consider all buildings located within the county as vulnerable.

Critical Facilities

All critical facilities and communities within the county are at risk. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts include structural failure due to fire or explosion and loss of function of the facility (e.g., a damaged police station will no longer be able to serve the community). Table 4-8 lists the types and numbers of all essential facilities in the area. A map and list of all critical facilities are included as Appendices E and F.

Building Inventory

A table of building exposure in terms of types and numbers of buildings for the entire county is listed in Table 4-9. Buildings within the county can expect impacts similar to those discussed for critical facilities. These impacts include structural failure due to fire or explosion or debris and loss of function of the building (e.g., a damaged home will no longer be habitable causing residents to seek shelter).

Infrastructure

During a hazardous material release the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since an extensive inventory of the infrastructure is not available to this plan, it is important to emphasize that any number of these items could become damaged in the event of a hazardous material release. The impacts to these items include broken, failed, or impassable roadways; broken or failed utility lines (e.g., loss of power or gas to community); and railway failure from broken or impassable railways. Bridges could become impassable causing risk to traffic.

In terms of numbers and types of buildings and infrastructure, typical scenarios are described to gauge the possible impacts of hazardous material release events in the county.

ALOHA Hazardous Chemical Release Analysis

The U.S. EPA's ALOHA (Areal Locations of Hazardous Atmospheres) model was utilized to assess the area of impact for a chlorine release for two different locations. The first scenario is near Stonefort along Grassy Creek Road at the intersection of a major railway. This scenario was chosen because of a historical train derailment that potentially could carry toxic chemicals. The second scenario is in Harrisburg at the intersection of US-45 and IL-13. This scenario was chosen because of the transportation of toxic chemicals by road through this high population density area.

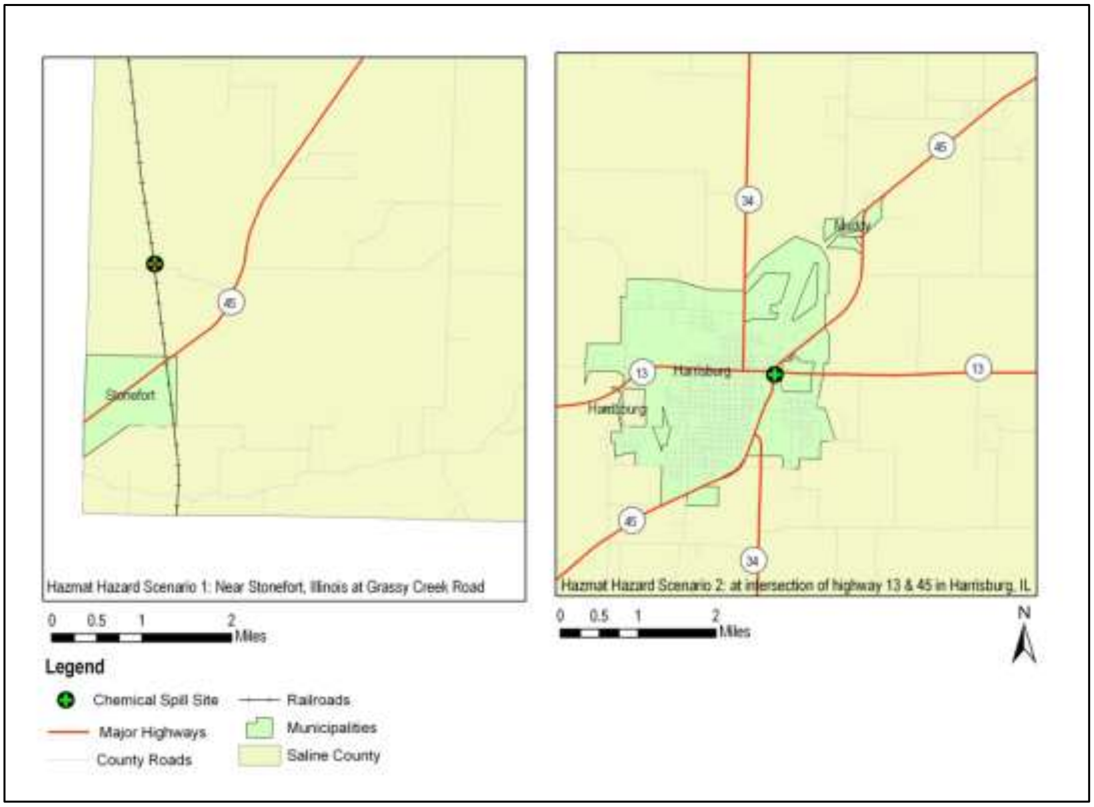
Chlorine is a greenish yellow gas with a pungent to suffocating odor. The gas liquefies above -35°Cat ambient pressure and will liquefy from pressure applied at room temperature. Contact with unconfined liquid chlorine can cause frostbite from evaporative cooling. Chlorine does not burn but, like oxygen, supports combustion. The toxic gas can have adverse health effects from either long-term inhalation of low concentrations of vapors or short-term inhalation of high concentrations. Chlorine vapors are much heavier than air and tend to settle in low areas. Chlorine is commonly used to purify water, bleach wood pulp, and make other chemicals (NOAA Reactivity 2007).

SOURCE: HTTP://CAMEOCHEMICALS.NOAA.GOV/CHEMICAL/2862

ALOHA is a computer program designed especially for response to chemical accidents, as well as for emergency planning and training. Chlorine is a common chemical used in industrial operations and can be found in either liquid or gas form. Rail and truck tankers commonly haul chlorine to and from facilities.

For this scenario, moderate atmospheric and climatic conditions with a slight breeze from the west were assumed. The geographic area covered in this analysis is depicted in Figure 4-15.

Figure 4-15: Location of Modeled Chemical Release in Stonefort and Harrisburg, IL



Analysis Parameters

The ALOHA atmospheric modeling parameters, depicted in Figure 4-16, were based upon western wind speed of 5 miles per hour. The temperature was 68 °F with 75% humidity and a cloud cover of five-tenths skies. The same parameters were used for both scenarios.

The source of the chemical spill is a horizontal, cylindrical-shaped tank. The diameter of the tank was set to 8 feet and the length set to 33 feet (12,408 gallons). At the time of its release, it was estimated that the tank was 85% full. The chlorine in this tank is in its liquid state.

This release was based on a leak from a 2.0-inch-diameter hole, 12 inches above the bottom of the tank. According to the ALOHA parameters, approximately 10,400 pounds of material would be released per minute. Figure 4-17 depicts the plume footprint generated by ALOHA.

Figure 4-16: ALOHA Modeling Parameters for Chemical Release in Stonefort and Harrisburg, IL

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SITE DATA:
  Location: STONEFORT, ILLINOIS
  Building Air Exchanges Per Hour: 0.39 (unsheltered single storied)
  Time: January 16, 2012  1253 hours CST (using computer's clock)

CHEMICAL DATA:
  Chemical Name: CHLORINE                Molecular Weight: 70.91 g/mol
  AEGL-1(60 min): 0.5 ppm   AEGL-2(60 min): 2 ppm   AEGL-3(60 min): 20 ppm
  IDLH: 10 ppm
  Ambient Boiling Point: -29.8° F
  Vapor Pressure at Ambient Temperature: greater than 1 atm
  Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
  Wind: 5 miles/hour from W at 10 meters
  Ground Roughness: open country         Cloud Cover: 5 tenths
  Air Temperature: 68° F                 Stability Class: C
  No Inversion Height                    Relative Humidity: 75%

SOURCE STRENGTH:
  Leak from hole in horizontal cylindrical tank
  Non-flammable chemical is escaping from tank
  Tank Diameter: 8 feet                  Tank Length: 33 feet
  Tank Volume: 12,408 gallons
  Tank contains liquid                   Internal Temperature: 68° F
  Chemical Mass in Tank: 55 tons         Tank is 75% full
  Circular Opening Diameter: 2.5 inches
  Opening is 12 inches from tank bottom
  Release Duration: 15 minutes
  Max Average Sustained Release Rate: 10,400 pounds/min
     (averaged over a minute or more)
  Total Amount Released: 101,933 pounds
  Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).
```

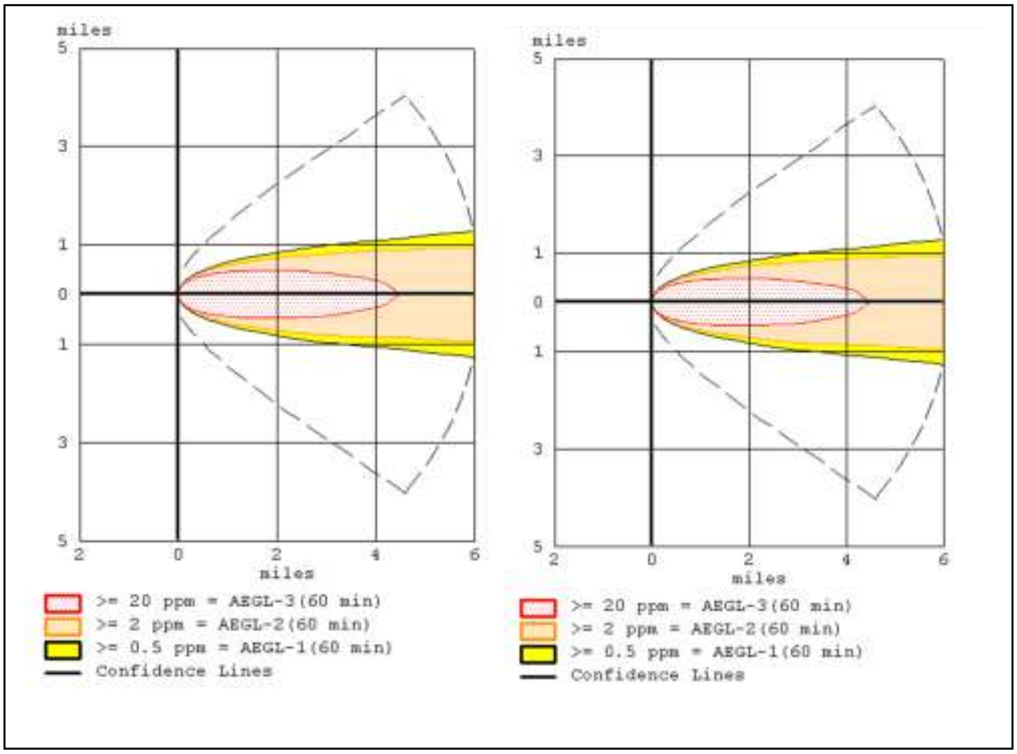
```
SITE DATA:
  Location: HARRISBURG, ILLINOIS
  Building Air Exchanges Per Hour: 0.39 (unsheltered single storied)
  Time: January 16, 2012  1313 hours CST (using computer's clock)

CHEMICAL DATA:
  Chemical Name: CHLORINE                Molecular Weight: 70.91 g/mol
  AEGL-1(60 min): 0.5 ppm   AEGL-2(60 min): 2 ppm   AEGL-3(60 min): 20 ppm
  IDLH: 10 ppm
  Ambient Boiling Point: -29.7° F
  Vapor Pressure at Ambient Temperature: greater than 1 atm
  Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
  Wind: 5 miles/hour from W at 10 meters
  Ground Roughness: open country         Cloud Cover: 5 tenths
  Air Temperature: 68° F                 Stability Class: C
  No Inversion Height                    Relative Humidity: 75%

SOURCE STRENGTH:
  Leak from hole in horizontal cylindrical tank
  Non-flammable chemical is escaping from tank
  Tank Diameter: 8 feet                  Tank Length: 33 feet
  Tank Volume: 12,408 gallons
  Tank contains liquid                   Internal Temperature: 68° F
  Chemical Mass in Tank: 55 tons         Tank is 75% full
  Circular Opening Diameter: 2.5 inches
  Opening is 12 inches from tank bottom
  Release Duration: 15 minutes
  Max Average Sustained Release Rate: 10,400 pounds/min
     (averaged over a minute or more)
  Total Amount Released: 101,933 pounds
  Note: The chemical escaped as a mixture of gas and aerosol (two phase fl
```

Figure 4-17: ALOHA-Generated Plume Footprint of Stonefort (left) and Harrisburg (right), IL Chemical Release

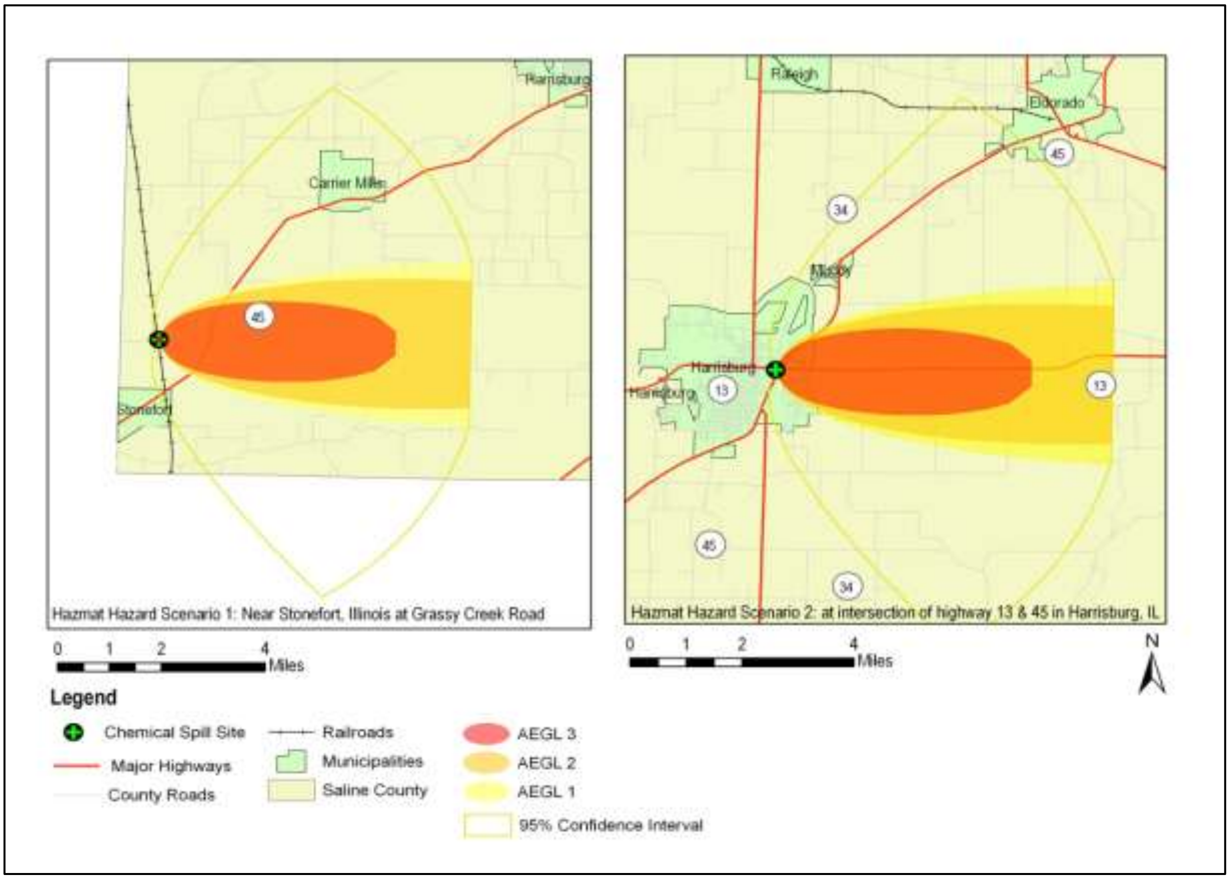


Acute Exposure Guideline Levels (AEGLs) are intended to describe the health effects on humans due to once-in-a-lifetime or rare exposure to airborne chemicals. The National Advisory Committee for AEGLs is developing these guidelines to help both national and local authorities, as well as private companies, deal with emergencies involving spills or other catastrophic exposures. As the substance moves away from the source, the level of substance concentration decreases. Each color-coded area depicts a level of concentration measured in parts per million (ppm). The image in Figure 4-18 depicts the plume footprint generated by ALOHA in ArcGIS.

- **AEGL 3:** Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death. The red buffer (≥20.0 ppm) extends no more than four miles from the point of release after one hour.
- **AEGL 2:** Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape. The orange buffer (≥ 2.0 ppm) extends greater than six miles from the point of release after one hour.
- **AEGL 1:** Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure. The yellow buffer (≥ 0.5 ppm) extends more than six miles from the point of release after one hour.

- **Confidence Lines**: The dashed lines depict the level of confidence in which the exposure level will be contained. The ALOHA model is 95% confident that the release will stay within this boundary.

Figure 4-18: ALOHA Plume Footprint Overlaid in ArcGIS



Results for Hazardous Chemical Release Analysis

An estimate of property exposed to the chlorine spill was calculated by using the building inventory and intersecting these data with each of the AEGL levels (AEGL 3: ≥ 20.0 ppm, AEGL: ≥ 2.0 ppm and Level 1: ≥ 0.5 ppm.). This GIS overlay analysis estimates the full replacement cost of the buildings exposed to the chlorine plume in scenario 1 are over \$8.3 million; scenario 2 the full replacement cost is over \$76.4 million. The results by AEGL level are presented in Table 4-33 and 4-34 and a map of the building inventory is seen in Figure 4-19.

Table 4-33: Estimated Building Exposure (with building count in parenthesis) for all AEGL Zones (x \$1000) in the Stonefort Scenario

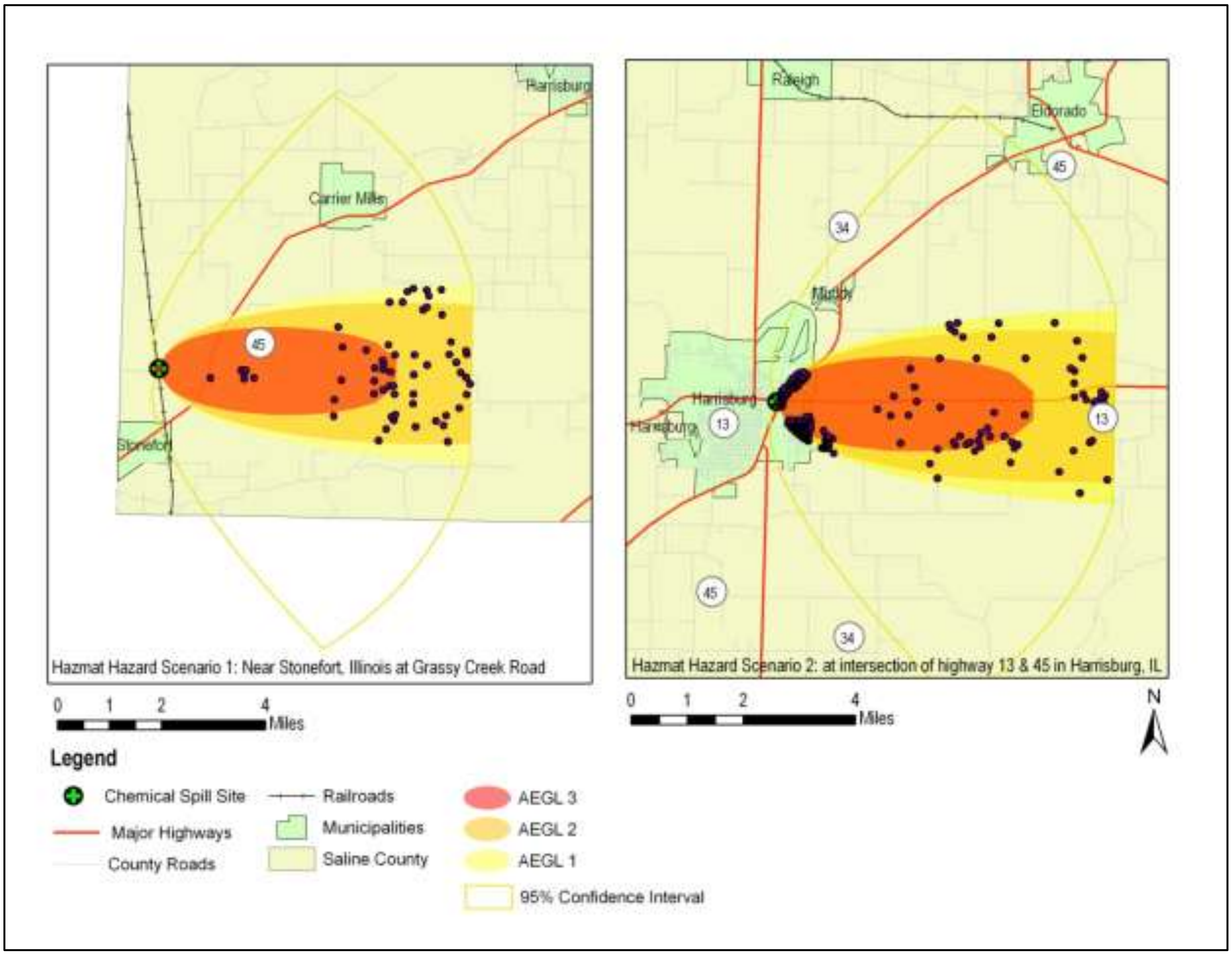
Occupancy	AEGL 1	AEGL 2	AEGL 3
Residential	499 (5)	2,685 (23)	1,132 (14)
Commercial	-	-	238 (1)
Industrial	-	-	-
Agriculture	128 (2)	348 (8)	286 (1)

Occupancy	AEGL 1	AEGL 2	AEGL 3
Religious	-	2,000 (2)	1,000 (1)
Government	-	-	-
Education	-	-	-

Table 4-34: Estimated Building Inventory (with building count in parenthesis) for all AEGL Zones (x$1000) in the Harrisburg Scenario

Occupancy	AEGL 1	AEGL 2	AEGL 3
Residential	2,588 (19)	6,436 (49)	5,821 (68)
Commercial	631 (5)	10,994 (9)	18,643 (38)
Industrial	-	1,045 (2)	-
Agriculture	102 (4)	287 (4)	874 (11)
Religious	1,000 (1)	1,000 (1)	-
Government	-	-	2,000(4)
Education	-	25,000 (1)	-

Figure 4-19: Building Inventory within the AEGL of the chlorine spill for both scenario 1 and 2



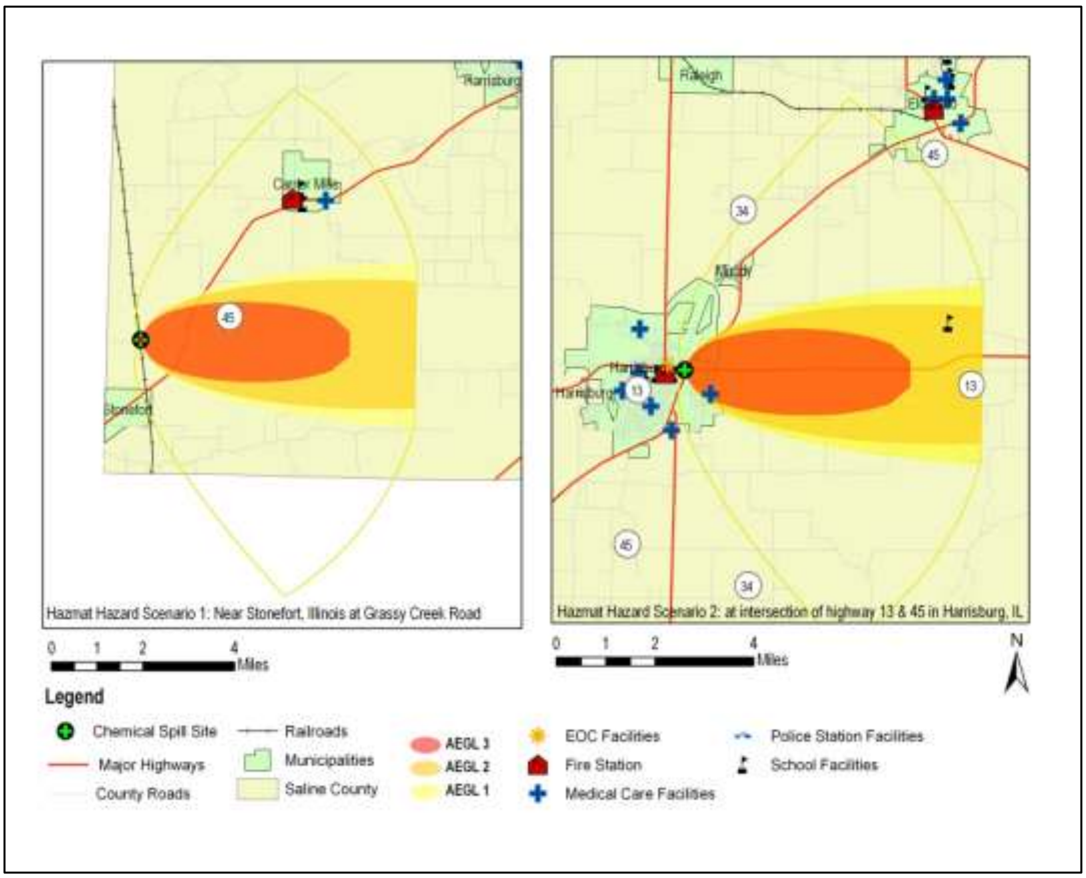
Critical Facilities Damage

There are two critical facilities within the limits of the chemical spill plume, none of which are located within Scenario 1 near Stonefort, IL. The affected facilities are identified in Table 4-35 and in Figure 4-20.

Table 4-35: Essential Facilities within Plume Footprint

Critical Facility	Facility Name
Medical Care Facilities	Harrisburg Medical Center
Schools	Southeastern Illinois College

Figure 4-20: Map of Essential Facilities Located within the Plume Footprint in Stonefort and Harrisburg, IL



Building Inventory Damage

Table 4-10 lists the building exposure in terms of type and number of buildings for the entire county. Buildings within the county can all expect impacts similar to those discussed for critical facilities. These impacts include structural failure due to fire or explosion or debris and loss of function of the building (e.g., a damaged home will no longer be habitable causing residence to seek shelter).

Vulnerability to Future Assets/Infrastructure of Hazardous Materials Storage and Transportation Hazard

Any new development within the county will be vulnerable to these events, especially development along major roadways.

Suggestion for Community Development Trends

Because the hazardous material hazard events may occur anywhere within the county, future development will be impacted. The major transportation routes and the industries located in Saline County pose a threat of dangerous chemicals and hazardous materials release.

4.4.7 Fire Hazard

Hazard Definition for Fire Hazard

This plan will address three major categories of fires for Saline County: 1) tire/scrap fires; 2) structural fires; and 3) wildfires.

Tire Fires

The state of Illinois generates thousands of scrap tires annually. Many of those scrap tires end up in approved storage sites that are carefully regulated and controlled by federal and state officials. However, scrap tires are sometimes dumped in unapproved locations throughout the state. The number of unapproved locations cannot be readily determined.

Tire disposal sites can be fire hazards, in large part, because of the number of scrap tires typically present at one site. This large amount of fuel renders standard firefighting practices nearly useless. Flowing and burning oil released by the scrap tires can spread the fire to adjacent areas. Tire fires differ from conventional fires in the following ways:

- Relatively small tire fires can require significant fire resources to control and extinguish.
- Those resources often strain local community and county capabilities.
- There may be significant environmental consequences of a major tire fire. Extreme heat can convert a standard vehicle tire into approximately two gallons of oily residue that may leak into the soil or migrate to streams and waterways.

Structural Fires

Lightning strikes, poor building construction, and building condition are the main causes for most structural fires in Illinois. Saline County has a few structural fires each year countywide.

Wildfires

When hot and dry conditions develop, forests may become vulnerable to wildfires. In the past few decades, increased commercial and residential development near forested areas has dramatically changed the nature and scope of the wildfire hazard. In addition, the increase in structures resulting from new development can strain the effectiveness of fire service personnel in the county.

Previous Occurrences for Fire Hazard

Saline County has not experienced a significant or large-scale fire that has resulted in a large number of fatalities or serious injuries.

Geographic Location for Fire Hazard

Fire hazards occur countywide and therefore affect the entire county. The forested areas in the county have a higher chance of widespread fire hazard.

Hazard Extent for Fire Hazard

The extent of the fire hazard varies both in terms of the severity of the fire and the type of material being ignited. All communities in Saline County are threatened by fire.

Risk Identification for Fire Hazard

Based on input from the planning team, the occurrence of a fire is likely. According to the RPI, fire/explosion is ranked as the number ten hazard.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
1	x	4	=	4

Vulnerability Analysis for Fire Hazard

Fire hazard threatens the entire jurisdiction; therefore, the entire population and all buildings within the county are vulnerable to fires.

The building exposure for Saline County, as determined from the building inventory, is included in Table 4-10. The entire population and all buildings have been identified at risk.

Critical Facilities

All critical facilities are vulnerable to fire hazards. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts include structural damage from fire and water damage from efforts extinguishing fire. Table 4-9 lists the types and numbers of essential facilities in the area. A map and list of all critical facilities is included in Appendices E and F.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is provided in Table 4-10. Impacts to the general buildings within the county are similar to the damages expected to the critical facilities. These impacts include structural damage from fire and water damage from efforts to extinguish the fire.

Infrastructure

During a fire the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is equally vulnerable, it is important to emphasize that any number of these items could become damaged during a fire. Potential impacts include structural damage resulting in impassable roadways and power outages.

Vulnerability to Future Assets/Infrastructure for Fire Hazard

Any future development will be vulnerable to these events.

Assessment of Community Development Trends

Fire hazard events may occur anywhere within the county, therefore future development is also at-risk.

4.4.8 Drought and Extreme Heat

Hazard Definition for Drought Hazard

Drought is a climatic phenomenon that occurs in Saline County. The meteorological condition that creates a drought is below-normal rainfall. However, excessive heat can lead to increased evaporation, which will enhance drought conditions. Droughts can occur in any month. Drought differs from normal arid conditions found in low-rainfall areas. Drought is the consequence of a reduction in the amount of precipitation over an undetermined length of time (usually a growing season or longer).

The severity of a drought depends on location, duration, and geographical extent. Additionally, drought severity depends on the water supply, usage demands by human activities, vegetation, and agricultural operations. Drought brings several different problems that must be addressed. The quality and quantity of crops, livestock, and other agricultural assets will be affected during a drought. Drought can adversely impact forested areas leading to an increased potential for extremely destructive forest and woodland fires that could threaten residential, commercial, and recreational structures.

Hazard Definition for Extreme Heat Hazard

Drought conditions are often accompanied by extreme heat, which is defined as temperatures that exceed by 10°F or more the average high for the area and last for several weeks.

Common Terms Associated with Extreme Heat

Heat Wave: Prolonged period of excessive heat, often combined with excessive humidity.

Heat Index: A number, in degrees Fahrenheit, that tells how hot it feels when relative humidity is added to air temperature. Exposure to full sunshine can increase the heat index by 15°F.

Heat Cramps: Muscular pains and spasms due to heavy exertion. Although heat cramps are the least severe, they are often the first signal that the body is having trouble with heat.

Heat Exhaustion: Typically occurs when people exercise heavily or work in a hot, humid place where body fluids are lost through heavy sweating. Blood flow to the skin increases, causing blood flow to decrease to the vital organs, resulting in a form of mild shock. If left untreated, the victim's condition will worsen. Body temperature will continue to rise, and the victim may suffer heat stroke.

Heat and Sun Stroke: A life-threatening condition. The victim's temperature control system, which produces sweat to cool the body, stops working. The body's temperature can rise so high that brain damage and death may result if the body is not cooled quickly.

Source: FEMA

Previous Occurrences for Drought and Extreme Heat

The NCDC database reported 34 drought/heat wave events in Saline County since 1995. The most recent excessive heat event was reported in August 2011. Average heat index values during this period reached about 116ºF.

NCDC records of droughts/heat waves are identified in Table 4-36. Additional details of individual hazard events can be found on the NCDC website.

Table 4-36: NCDC-Recorded Drought and/or Extreme Heat Events with damages, deaths, or injuries for Saline County, IL

Location or County	Date	Type	Deaths	Injuries	Property Damage (x$1000)	Crop Damage (x$1000)
Saline	9/1/2002	Drought	0	0	0	53,000
Saline	7/2/1997	Excessive Heat	1	0	0	0
Saline	7/25/1997	Excessive Heat	0	12	0	0
Saline	6/22/1998	Excessive Heat	1	0	0	0
Saline	7/18/1999	Excessive Heat	4	0	0	0
Saline	8/3/2002	Excessive Heat	0	8	0	0
Saline	7/21/2005	Excessive Heat	0	62	0	0
Saline	7/7/1995	Heat Wave	0	0	0	50
Saline	8/10/1995	Heat Wave	0	1	0	0
Total			6	83	0	$53 million

*NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

Geographic Location for Drought and Extreme Heat

Droughts are regional in nature. Most areas of the United States are vulnerable to the risk of drought and extreme heat.

Hazard Extent for Drought and Extreme Heat

The extent of droughts or extreme heat varies both depend on the magnitude and duration of the heat and the range of precipitation.

Risk Identification for Drought and/or Extreme Heat

Based on input from the planning team, the occurrence of a drought and/or extreme heat is likely. According to the RPI, fire/explosion is ranked as the number eight hazard.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
3	x	3	=	9

Vulnerability Analysis for Drought and Extreme Heat

Drought and extreme heat impacts a threat across the entire jurisdiction; therefore, the county is vulnerable to this hazard and can expect impacts within the affected area. According to FEMA, approximately 175 Americans die each year from extreme heat. Young children, elderly, and infirmed populations have the greatest risk.

The entire population and all buildings have been identified as at-risk. The building exposure for Saline County, as determined from the building inventory, is included in Table 4-9.

Critical Facilities

All critical facilities are vulnerable to drought. A critical facility will encounter many of the same impacts as any other building within the jurisdiction, which should involve little or no damage. Impacts include water shortages, fires as a result of drought conditions, and residents in need of medical care from the heat and dry weather. Table 4-9 lists the types and numbers of all of the essential facilities in the area. A map and list of all critical facilities are included in Appendices E and F.

Building Inventory

A table of the building exposure showing types and numbers of buildings for the entire county is listed in Table 4-10. The buildings within the county can all expect impacts similar to those discussed for critical facilities. These impacts include water shortages, fires as a result of drought conditions, and residents in need of medical care from the heat and dry weather.

Infrastructure

During a drought, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. The risk to these structures is primarily associated with a fire that could result from hot, dry conditions. Since the county's entire infrastructure is vulnerable, it is important to emphasize that any number of these items could become damaged during a heat wave. The impacts to these items include impassable roadways; broken or failed utility lines (e.g., loss of power or gas to community); or impassable railways. Bridges could become impassable causing risk to traffic.

Vulnerability to Future Assets/Infrastructure for Drought/Extreme Heat Hazard

Future development will remain vulnerable to droughts. Typically, some urban and rural areas are more susceptible than others. For example, urban areas are subject to water shortages during periods of drought. Excessive demands of the populated area place a limit on water resources. In rural areas, crops and livestock may suffer from extended periods of heat and drought. Dry conditions can lead to the ignition of wildfires that could threaten residential, commercial, and recreational areas.

Assessment of Community Development Trends

Because droughts and extreme heat are regional in nature, future development across the county will be susceptible to drought. Although urban and rural areas are equally vulnerable to this hazard, those living in urban areas may have a greater risk from the effects of a prolonged heat wave. The atmospheric conditions that create extreme heat tend to trap pollutants in urban areas, adding contaminated air to the excessively hot temperatures and creating increased health problems. Furthermore, asphalt and concrete store heat longer, gradually releasing it at night and producing high nighttime temperatures. This phenomenon is known as the "urban heat island effect."

Source: FEMA

Local officials should address drought and extreme heat hazards by educating the public on steps to take before and during the event—for example, temporary window reflectors to direct heat back outside, staying indoors as much as possible, and avoiding strenuous work during the warmest part of the day.

4.4.9 Ground Failure Hazard

Subsidence

Subsidence is a sinking of the land surface. In Illinois, this is usually associated with either underground mining or collapse of soil into crevices in underling soluble bedrock. Areas at risk for subsidence can be determined from detailed mapping of geologic conditions or detailed mine maps. Data sources were compiled from the Illinois Geologic Survey and Illinois Department of Natural Resources to assess the risk of subsidence in Saline County. This section provides an overview of the subsidence hazards in Illinois in general and a discussion of the potential subsidence risk for Saline County.

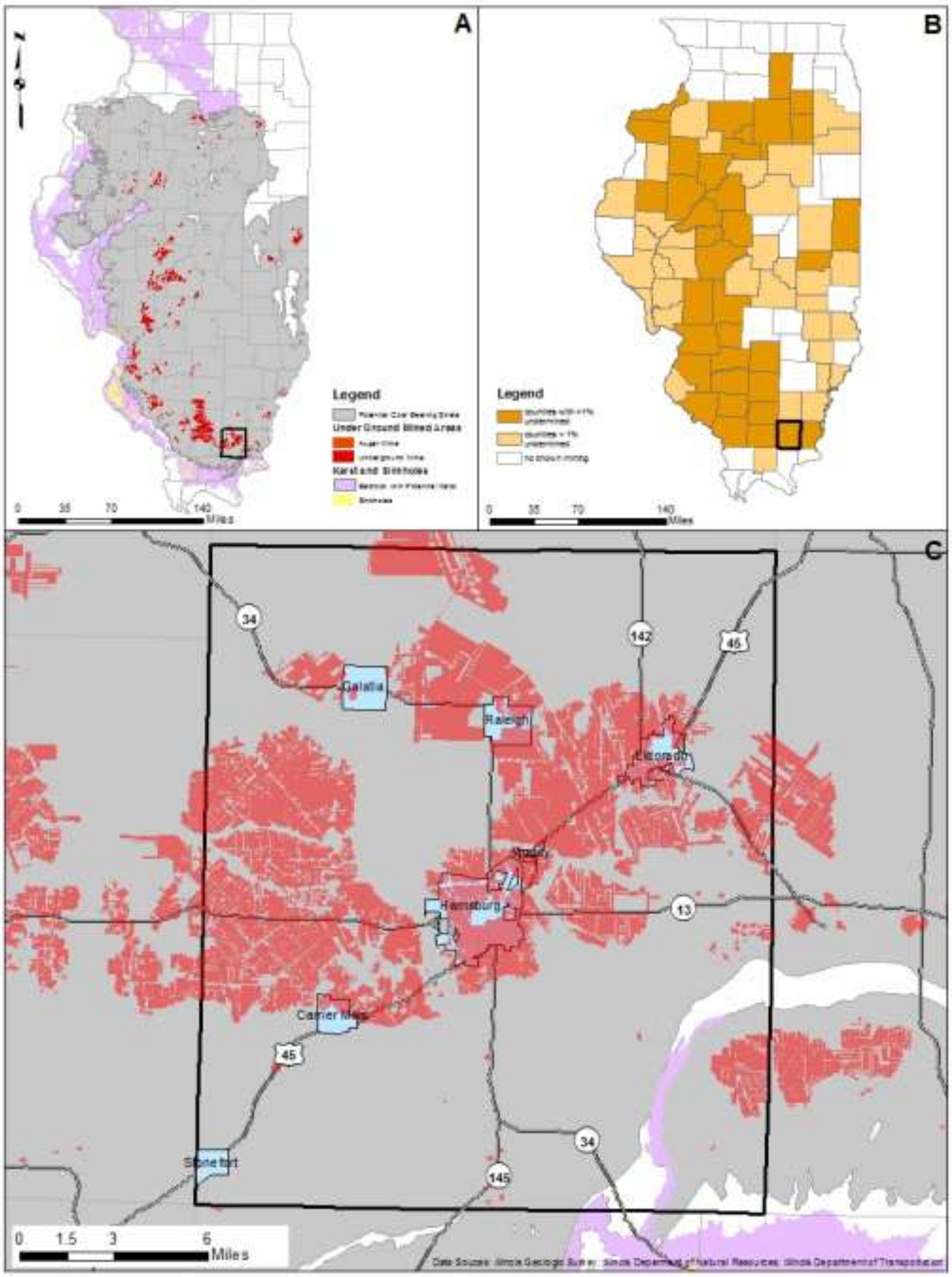
Underground Mining and Subsidence

Underground mines have been used extensively in Illinois to extract coal, lead, zinc, fluorites, shale, clay stones, limestone, and dolomite. When mining first began in Illinois, land over mined areas was sparsely populated. If the ground subsided, homes or other structures were seldom damaged. As towns and cities expanded over mined-out areas, subsidence damage to structures became increasingly more common. The most common underground mines in Illinois are coal mines. A recent study found that approximately 333,100 housing units were located over or adjacent to coal mines in Illinois (Bauer, 2008).

Illinois has abundant coal resources. All or parts of 86 of 102 counties in the state have coal-bearing strata. As of 2007, approximately 1,050,400 acres (2.8% of the state) were mined. Of that total, 836,655 acres are underground mines (Bauer, 2008). Illinois ranks first among all U.S. states for reserves of bituminous coal (Illinois Coal Association, 1992).

Figure 4-21a shows the statewide distribution of bedrock with karst potential, coal bearing strata, sink holes, and underground mines. Figure 4-21b shows the counties which are 0, < 1%, and >1% undermined; Figure 4-21c shows the distribution of bedrock with karst potential, coal bearing strata, sink holes, and underground mines in Saline County.

Figure 4-21a, b, c: Maps of Statewide and Countywide Areas with Subsidence Hazard Potential



Mining Methods

There are two fundamental underground mining methods used in Illinois: high-extraction methods, such as long-wall and low-extraction room-and-pillar mining. High-extraction methods remove almost all of the coal in localized areas. For modern mining practices, subsidence associated with high-extraction methods is planned and regulated by state and federal authorities. The subsurface subsides above the mine within several days or weeks after the coal has been removed. Subsidence of the overburden above the mined-out area can continue up to seven years after subsurface removal, depending on the local geologic conditions (Bauer, 2008). The initial ground movements associated with this mining, which tend to be the largest, diminish rapidly after a few months. After subsidence has decreased to a level that no longer causes damage to structures, the land may be suitable for development. The maximum amount of subsidence is proportional to the amount of material extract and the depth between the mining and the surface. In general, over the centerline of the mine panel, subsidence can be 60% to 70% of the extract material (e.g., 10 ft of material extracted would cause a maximum subsidence of six to seven feet; Bauer, 2006).

For low-extraction techniques such as room-and-pillar mining, miners create openings (rooms) as they work. Enough of the coal layer is left behind in the pillars to support the ground surface. In Illinois, this system of mining extracts 40% to 55% of the coal resources in modern mines and up to 75% in some older mines. Based on current state regulations, room-and-pillar mines in operation after 1983 that do not include planned subsidence must show that they have a stable design. Although these permitting requirements have improved overall mine stability, there are no guarantees that subsidence will not occur above a room-and-pillar mine in the future. In general, if coal or other mined resources have been removed from an area, subsidence of the overlying material is always a possibility (Bauer, 2006).

Types of Mine Subsidence

In Illinois, subsidence of the land surface related to underground mining can take two forms: pit subsidence or trough (sag) subsidence. Pit subsidence structures generally range from two to 40 feet in diameter. Pit subsidence mostly occurs over shallow mines that are <100 feet deep where the overlying bedrock is <50 feet thick and composed of weak rock materials, such as shale. The pit is produced when the mine roof collapses and the roof fall void works its way to the surface. These structures form rapidly. If the bedrock is only a few feet thick and the surface materials are unconsolidated (loose), these materials may fall into adjacent mine voids, producing a surface hole deeper than the height of the collapse mine void. Pit subsidence can cause damage to a structure if it develops under the corner of a building, under a support post of a foundation, or in another critical location. Subsidence pits should be filled to ensure that people or animals do not fall into these structures (Bauer, 2006).

Trough subsidence forms a gentle depression over a broad area. Some trough subsidence may be as large as a whole mine panel (i.e., several hundred feet long and a few hundred feet wide). Several acres of land may be affected by a single trough event or feature. As previously discussed, the maximum vertical settlement is 60% to 70% of the height of material removed (e.g., two to six feet). Significant troughs may develop suddenly, within a few hours or days, or gradually over a period of years. Troughs originate over places in mines where pillars have collapsed, producing downward movement at the ground surface. These failures can develop over mines of any depth. Trough subsidence produces an orderly pattern of tensile features (tension cracks) surrounding a central area of possible compression features. The type and extent of damage to surface structures relates to their orientation and position within a trough. In the tension zone, the downward-bending movements that develop in the ground may damage buildings, roads, sewer and water pipes, and other utilities. The downward bending of the ground surface causes the soil to crack, forming the tension cracks that pull structures apart. In the relatively smaller compression zone, roads may buckle and foundation walls may be pushed inward. Buildings damaged by compressional forces typically need their foundations rebuilt and may also need to be leveled due to differential settling (Bauer, 2006).

Mine Subsidence Insurance

The Mine Subsidence Insurance Act, as of 1979, created subsidence insurance as part of an Illinois homeowner's policy. Homeowners in any of the Illinois counties undermined by approximately 1% or more automatically have mine subsidence insurance as a part of their policy, unless coverage is waived in writing. Mine subsidence insurance is especially important for homes located near to or over mines that operated before the 1977 Surface Mine Control and Reclamation Act. The companies that operated these mines may no longer be in business (Bauer, 2006).

Mine Subsidence in Saline County

Almost 100% of Saline County is underlain by rock units which potentially contain coal. Analysis of the GIS data layer of active and abandoned coal mines in Illinois obtained from the Illinois Department of Natural Resources (ILDNR) revealed that 153mi^2 of Saline County (~41%) has been undermined. The undermined areas are mainly located in the central area of the county. Galatia, Raleigh, Eldorado, Harrisburg and Carrier Mills are all highly susceptible to subsidence. Comparison of the GIS layer of parcels with structures attained from Saline County with IDNR GIS layer of active and abandoned underground-coal mines was performed. This analysis revealed that 5592 out of the 11,429 or ~49% of the buildings in the county were above undermined areas.

Subsidence Related to Karst Features

Subsidence can also occur on land located over soluble bedrock. The land over such bedrock often has topography characteristics of past subsidence events. This topography is termed "karst." Karst terrain has unique landforms and hydrology found only in these areas. Bedrock in karst areas typically includes limestone, dolomite, or gypsum. In Illinois, limestone and dolomite (carbonate rocks) are the principle karst rock types; 9% of Illinois has carbonate rock types close enough to the ground surface to have a well-developed karst terrain. The area in Illinois where karst terrain is most developed is the southern and southwestern part of the state (Panno, et al., 1997).

Sinkhole Formation

The karst feature most associated with subsidence is the sinkhole. A sinkhole is an area of ground with no natural external surface drainage—when it rains, all of the water stays inside the sinkhole and typically drains into the subsurface that is connected to a subsurface karst system. Sinkholes can vary from a few feet to hundreds of acres, and from less than one to more than 100 feet deep. Typically, sinkholes form slowly, so that little change is seen during a lifetime, but they also can form suddenly when a collapse occurs. Such a collapse will damage any overlying structure and can have a dramatic effect if it occurs in a populated setting.

Sinkholes form where rainwater moves through the soil and encounters soluble bedrock. The bedrock begins to dissolve along horizontal and vertical cracks and joints in the rock. Eventually, these cracks become large enough to start transporting small soil particles. As these small particles of soil are carried off, the surface of the soil above the conduit slump down gradually, and a small depression forms on the ground surface. This depression acts like a funnel and gathers more water, which makes the conduit still larger and washes more soil into it.

Sinkhole Collapse

Sudden collapse of a sinkhole occurs when rock and soil close to the ground surface does not gradually move down, but instead forms a bridge. Beneath that surface cover, a void forms. These voids are essentially shallow caves. Over time, the void enlarges enough that the weight of the overlying bridge can no longer be supported. The surface layer then suddenly collapses into the void, forming a sinkhole.

The process of forming a void space usually takes decades or longer. However this natural process can be aggravated and expedited by human activates. Since the process of forming a sinkhole depends on water to carry soil particle down into the karst bedrock, anything that increases the amount of water flowing into the subsurface can accelerate sinkhole formation process. Parking lots, streets, altered drainage from construction, and roof drainage are a few of the things that can increase runoff.

Collapses are more frequent after intense rainstorms. However, drought and altering of the water table can also contribute to sinkhole collapse. Areas where the water table fluctuates or has suddenly been lowered are more susceptible to sinkhole collapse. It is also possible for construction activity to induce the collapse of near-surface voids or caves. In areas of karst bedrock, it is imperative that a proper geotechnical assessment be completed prior to construction of any significant structures. Solutions to foundation problems in karst terrain generally are expensive (White, 1988).

Sinkhole Subsidence or Collapse Potential for Saline County

Nearly all of Saline County is underlain by insoluble bedrock, and therefore subsidence related to karstic bedrock should not be a concern.

Hazard Extent for Ground Failure

The extent of subsidence hazard in Saline County is a function of where current development is located relative to areas of past and present underground mining and the occurrence of near-surface soluble bedrock such as limestone, dolomite, or halite.

Calculated Risk Priority Index for Ground Failure

Based on historical, geological, and mine information, future ground failure in undermined regions of Saline County is possible. According to the RPI, ground failure ranked as the number seven hazard in the county.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
3	x	3	=	9

Vulnerability Analysis for Ground Failure

The existing buildings and infrastructure of Saline County are discussed in types and numbers in Table 4-9.

Critical Facilities

Any critical facility built above highly soluble bedrock or an underground mine could be vulnerable to land subsidence. A critical facility will encounter the same impacts as any other building within the affected area. These impacts include damages ranging from cosmetic to structural. Buildings may sustain minor cracks in walls due to a small amount of settling, while in more severe cases, the failure of building foundations can cause cracking of critical structural elements. Table 4-10 lists the essential facilities in the area. Critical facility information, including replacement costs, is included in Appendix E. A map of the critical facilities is included in Appendix F.

Building Inventory

Table 4-10 lists the building exposure in terms of types and numbers of buildings for the entire county. The buildings within this area can anticipate impacts similar to those discussed for critical facilities, ranging from cosmetic to structural. Buildings may sustain minor cracks in walls due to a small amount of settling, while in more severe cases, the failure of building foundations causes cracking of critical structural elements.

Infrastructure

Ground subsidence areas within Saline County could impact the roadways, utility lines/pipes, railroads, and bridges. The risk to these structures is primarily associated with land collapsing directly beneath them in a way that undermines their structural integrity. The impacts to these items include broken, failed, or impassable roadways; broken or failed utility lines (e.g., loss of power or gas to community); and railway failure from broken or impassable railways. In addition, bridges could fail or become impassable to traffic.

Vulnerability to Future Assets/Infrastructure for Ground Failure

New buildings and infrastructure placed on undermined land or on highly soluble bedrock will be vulnerable to ground failure.

Assessment of Community Development Trends

Abandoned underground mine subsidence may or may not affect several locations within the county; therefore buildings and infrastructure are vulnerable to subsidence. Continued development will occur in many of these areas. Currently, Saline County reviews new development for compliance with the local zoning ordinance. Newly planned construction should be reviewed with the historical mining maps to minimize potential subsidence structural damage.

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Section 5 Mitigation Strategies

The goal of mitigation is to reduce the future impacts of a hazard including property damage, disruption to local and regional economies, and the amount of public and private funds spent to assist with recovery. Overall, mitigation strategies attempt to build disaster-resistant communities. Mitigation actions and projects should be based on a well-constructed risk assessment (Section 4). Mitigation should be an ongoing process, adapting over time to accommodate a community's needs.

5.1 Community Capability Assessment

The capability assessment identifies current activities used to mitigate hazards. The capability assessment identifies the policies, regulations, procedures, programs, and projects that contribute to the lessening of disaster damages. The assessment also provides an evaluation of these capabilities to determine whether the activities can be improved in order to more effectively reduce the impact of future hazards. The following sections identify existing plans and mitigation capabilities within all of the communities listed in Section 2 of this plan.

5.1.1 National Flood Insurance Program (NFIP)

Carrier Mills, Galatia, Harrisburg, Muddy, and the unincorporated areas of Saline County participate in the NFIP. Communities with a flood risk who choose not to participate in the NFIP include Eldorado, Raleigh and Stonefort. Saline Name County will continue to educate these jurisdictions on the benefits of the program. A summary of additional information for Saline County participation in the NFIP is listed in Table 5-2.

The county and incorporated areas do not participate in the NFIP'S Community Rating System (CRS). The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: 1) reduce flood losses; 2) facilitate accurate insurance rating; and 3) promote the awareness of flood insurance.

Table 5-1: Additional Information on Communities Participating in the NFIP

Community	Participation Date	FIRM Date	CRS Date	CRS Rating	Floodplain Ordinance
Carrier Mills	7-3-1985	12-16-11	N/A	N/A	12-15-2011
Galatia	6-3-1986	12-16-11	N/A	N/A	11-4-2011
Harrisburg	5-12-2008	12-16-11	N/A	N/A	12-1-2011
Muddy	12-5-1989	12-16-11	N/A	N/A	12-6-2011
Saline County	1-6-2009	12-16-11	N/A	N/A	10-27-2011
Eldorado	N/A	12-16-11	N/A	N/A	N/A
Raleigh	N/A	12-16-11	N/A	N/A	N/A
Stonefort	N/A	12-16-11	N/A	N/A	N/A

*NFIP status and information are documented in the Community Status Book Report updated on 7/29/2012.

Since 1978 when the NFIP was established, Saline County has had several flood insurance claims. Table 5-2 summarizes the claims since 1978.

Table 5-2: Policy and Claim Statistics for Flood Insurance in Saline County, IL

Community	Closed Losses	Open Losses	CWOP Losses	Total Losses	Payments
Carrier Mills	3	2	0	1	$29,756.48
Galatia	-	-	-	-	-
Harrisburg	3	3	0	0	$44,162.83
Muddy	-	-	-	-	-
Saline County	4	4	0	0	$128,966.65
Eldorado	-	-	-	-	-
Raleigh	-	-	-	-	-
Stonefort	-	-	-	-	-

*NFIP policy and claim statistics since 1978 until the most recently updated date of 10/31/2011. Closed Losses refer to losses that have been paid; open losses are losses that have not been paid in full; CWOP losses are losses that have been closed without payment; and total losses refers to all losses submitted regardless of status. Lastly, total payments refer to the total amount paid on losses.

5.1.2 Jurisdiction Ordinances

Ordinances that directly pertain, or can pertain to disaster mitigation are listed in Table 5-2 and are discussed in more detail, if information was provided, in this section

Table 5-3: List of Jurisdiction Ordinances and Their Most Recent Adoption Date

Community Name	Zoning	Stormwater Mgmt	Subdivision Control	Burning	Seismic	Erosion Mgmt	Land Use Plan	Building Codes
Saline County	N/A	N/A	3-5-1981	3-21-1996	N/A	N/NA	N/A	N/A

5.1.3 Fire Insurance Ratings

Table 5-4 lists Saline County's fire departments and respective information.

Table 5-4: Fire Departments, Their Insurance Ratings, and Number of Employees/Volunteers

Fire Department Name	Fire Insurance Rating	Number of Employees
Carrier Mills Fire Department	5/9	25
Galatia Fire Department	6/9	
Harrisburg Fire Department	4/8b	26
Eldorado Fire Department	5/9	28
Stonefort Fire Department	6	11

5.2 Mitigation Goals

In Section 4 of this plan, the risk assessment identified Saline County as prone to several hazards. The mitigation planning team members understand that although hazards cannot be eliminated altogether, Saline County can work toward building disaster-resistant communities. Following are a list of goals, objectives, and actions. The goals represent long-term, broad visions of the overall vision the county would like to achieve for mitigation. The objectives are strategies and steps that will assist the communities in attaining the listed goals.

Goal 1: Lessen the impacts of hazards to new and existing infrastructure

(a) Objective: Retrofit critical facilities and structures with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.

(b) Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.

(c) Objective: Minimize the amount of infrastructure exposed to hazards.

(d) Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county.

(e) Objective: Improve emergency sheltering in Saline County.

Goal 2: Create new or revise existing plans/maps for Saline County

(a) Objective: Support compliance with the NFIP for each jurisdiction in Saline County.

(b) Objective: Review and update existing, or create new, community plans and ordinances to support hazard mitigation.

(c) Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.

Goal 3: Develop long-term strategies to educate Saline County residents on the hazards affecting their county

(a) Objective: Raise public awareness on hazard mitigation.

(b) Objective: Improve education and training of emergency personnel and public officials.

5.3 Mitigation Actions/Plans

Upon completion of the risk assessment and development of the goals and objectives, the mitigation planning committee was provided a list of the six mitigation measure categories from the FEMA State and Local Mitigation Planning How-to Guides. The measures are listed as follows:

- **Prevention:** Government, administrative, or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and stormwater management regulations.
- **Property Protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard or removal from the hazard area. Examples include acquisition, elevation, structural retrofits, storm shutters, and shatter-resistant glass.
- **Public Education and Awareness:** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.
- **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses, preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream-corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- **Emergency Services:** Actions that protect people and property during and immediately after a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities.
- **Structural Projects:** Actions that involve the construction of structures to reduce the impacts of a hazard. Such structures include dams, levees, floodwalls, seawalls, retaining walls, and safe rooms.

After Meeting #3, held on January 17, 2012, mitigation planning team were presented with the task of individually listing potential mitigation activities using the FEMA evaluation criteria. The planning team brought their mitigation ideas to Meeting #4 which was held February 21, 2012. FEMA uses their evaluation criteria STAPLE+E (stands for social, technical, administrative, political, legal, economic and environmental) to assess the developed mitigation strategies.

Social:

- Will the proposed action adversely affect one segment of the population?
- Will the action disrupt established neighborhoods, break up voting districts, or cause the relocation of lower income people?

Technical:

- How effective is the action in avoiding or reducing future losses?
- Will it create more problems than it solves?
- Does it solve the problem or only a symptom?
- Does the mitigation strategy address continued compliance with the NFIP?

Administrative:

- Does the jurisdiction have the capability (staff, technical experts, and/or funding) to implement the action, or can it be readily obtained?
- Can the community provide the necessary maintenance?
- Can it be accomplished in a timely manner?

Political:

- Is there political support to implement and maintain this action?
- Is there a local champion willing to help see the action to completion?
- Is there enough public support to ensure the success of the action?
- How can the mitigation objectives be accomplished at the lowest cost to the public?

Legal:
- Does the community have the authority to implement the proposed action?
- Are the proper laws, ordinances, and resolution in place to implement the action?
- Are there any potential legal consequences?
- Is there any potential community liability?
- Is the action likely to be challenged by those who may be negatively affected?
- Does the mitigation strategy address continued compliance with the NFIP?

Economic:
- Are there currently sources of funds that can be used to implement the action?
- What benefits will the action provide?
- Does the cost seem reasonable for the size of the problem and likely benefits?
- What burden will be placed on the tax base or local economy to implement this action?
- Does the action contribute to other community economic goals such as capital improvements or economic development?
- What proposed actions should be considered but be “tabled” for implementation until outside sources of funding are available?

En**vironmental:**
- How will this action affect the environment (land, water, endangered species)?
- Will this action comply with local, state, and federal environmental laws and regulations?
- Is the action consistent with community environmental goals?

5.4 Implementation Strategy and Analysis of Mitigation Projects

Implementation of the mitigation plan is critical to the overall success of the mitigation planning process. The first step is to decide, based upon many factors, which action will be undertaken first. In order to pursue the top priority first, an analysis and prioritization of the actions is important. Some actions may occur before the top priority due to financial, engineering, environmental, permitting, and site control issues. Public awareness and input of these mitigation actions can increase knowledge to capitalize on funding opportunities and monitoring the progress of an action.

In Meeting #4, the planning team prioritized mitigation actions based on a number of factors. The factors were the STAPLE+E criteria listed in Table 5-2. A rating of high, medium, or low was assessed for each mitigation item and is listed next to each item in Table 5-3.

Table 5-1: Summary of STAPLE+E Criteria

S – Social	Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the population, do not cause relocation of lower income people, and if they are compatible with the community's social and cultural values.
T – Technical	Mitigation actions are technically most effective if they provide a long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – Economic	Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E – Environmental	Sustainable mitigation actions that do not have an adverse effect on the environment, comply with federal, state, and local environmental regulations, and are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

For each mitigation action related to infrastructure, new and existing infrastructure was considered. Additionally, the mitigation strategies address continued compliance with the NFIP. While an official cost-benefit review was not conducted for any of the mitigation actions, the estimated costs were discussed. The overall benefits were considered when prioritizing mitigation items from high to low. An official cost-benefit review will be conducted prior to the implementations of any mitigation actions. Table 5-3 presents mitigation projects developed by the planning committee, as well as actions that are ongoing or already completed. Since this is the first mitigation plan developed for Saline County, there are no deleted or deferred mitigation items.

Table 5-2: List of Saline County Mitigation Strategies Developed at Meeting 4 in Harrisburg, IL

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Distribute weather radios to critical facilities	Goal: Improve emergency communication with the critical facilities. Objective: Equip critical facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Thunderstorms, Winter Storms	Countywide	Complete	Critical facilities throughout the county are equipped with weather radios.
Enforce tie-down ordinance for mobile homes	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Tornado, Severe Thunderstorm, Winter Storm, Flood	Countywide	Ongoing	The County and its incorporated jurisdictions will provide education and rules on enforcing mobile home tie-downs.
Resource Mapping for Disaster	Goal: Lessen the impacts of hazards and reduce response time to provide persons with necessary resources for post-disaster survival Objective: Establish a resource map using GIS that may be made available to all emergency response personnel	All Hazards	Countywide	Complete	The County EMA will work with local jurisdictions to find out what and where necessary resources are for emergency management.
Implement Nixle for mass media release via e-mail and text messages; advertise to the public for participation	Goal: Enhance County's Emergency Notification System Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county	All Hazards	Countywide	Complete	The County EMA and local jurisdictions already participate in the Nixle program.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Purchase generators and/or transfer switches to provide back-up power to critical facilities, community shelters, and pump stations	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards. .	All Hazards	Countywide	Medium	The County and other jurisdictions will oversee the implementation of this project. Generators are desired for the Carrier Mills Municipal Center, the Galatia Community Center, the Eldorado Police Station, and the County Health Center.
Harden critical facilities such as fire stations, police stations, and city municipal buildings	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing	All Hazards	Countywide	Medium	The County EMA along with representatives from the incorporate communities will oversee the implementation of this project. Pre-disaster mitigation program and community development grants are a possible funding source. Implementation, if funding is available, is forecasted to begin within approximately three years.
Harden Egyptian Health Department	Goal: Lessen the impacts of hazards to new and existing infrastructure Objection: Retrofit facility with structural design practices and equipment that will withstand natural disasters and offer weather-proofing	All Hazards	Eldorado	Low	The County EMA along with representatives from the Health Department will oversee the implementation of this project. Hazard Mitigation Grant program and community development grants are a possible funding source. Implementation, if funding is available, is forecasted to begin within approximately three years.
Construct and/or improve storm shelters in mobile home parks	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in the community.	Tornado, Severe Thunderstorm, Winter Storm	Countywide	High	Local resources will be used to evaluate and determine areas to construct and/or update storm shelters for mobile home parks. Funding will be sought from local, state, and federal resources to complete the project.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Public education on the benefits of weather radios, warning sirens, and emergency kits	Goal: Educate the public about weather radio benefits, and thereby increase the number of radios in homes Objective: Develop an education platform to educate the community about the benefits of weather radios and how to obtain one	Tornado, Severe Thunderstorm, Winter Storm	Countywide	Medium	Funding will be sought from the disaster mitigation funds upon approval of the Multi-Hazard Mitigation Plan.
Encourage buried power lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards	Winter Storm, Severe Thunderstorm, Tornado	Countywide	Medium	The County EMA will oversee the implementation of this project. The pre-disaster mitigation program is a possible funding source. Implementation, if funding is available, is forecasted to be complete within approximately three years.
Establish a warming center in Carrier Mills	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in Saline County.	Winter Storm	Carrier Mills	Medium	The county EMA director will work with local shelters, schools, healthcare facilities, and first responders to identify locations to establish warming centers. The PDM program or local resources are funding options. If funding is available, implementation will begin within three years.
Develop a debris management plan and identify debris storage sites	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by hazards	Winter Storm	Countywide	Medium	The County engineer will work with local officials to develop a debris management plan. Funding for this will be sought through mitigation and recovery funds from FEMA and other emergency management grants.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Participate in the "Shakeout" earthquake scenario	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel, citizens, and public officials	Earthquake	Countywide	Ongoing	The County EMA and local officials are working with FEMA to participate in the "Shakeout". Schools, hospitals and other municipal facilities are registered to participate.
Construct a new Emergency Operations Center	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	All	Countywide	High	The County EMA will oversee the implementation of this project. The pre-disaster mitigation program and community development grants are a possible funding source. Implementation, if funding is available, is forecasted to begin within approximately one year.
Establish sheltering plans for persons with special needs	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in Saline County.	Thunderstorm, Tornado, Winter Storm	Countywide	Low	The county, local governments, and Saline County EMA will oversee the implementation of this project. Local resources will be used to identify the resources. The project is forecasted to be complete within approximately five years.
Establish a water distribution system	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against the secondary effects of hazards.	Earthquake	Countywide	High	The County Engineer will work with local emergency personnel to apply for funding for emergency water supplies and a plan for that water distribution. Many wells are currently located within the floodplain or subsidence areas and are highly susceptible to contamination and/or failure.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Install inertial valves at critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against the secondary effects of hazards.	Earthquake	Countywide	Medium	The county engineer will oversee implementation of this project. The PDM program and community grants are an option. If funding is available, implementation will begin within three years.
Institute a buy-out/mitigation plan for several homes in floodplains within the county	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Countywide	Complete and Ongoing	The county floodplain administrator will oversee the implementation of the project.
Upgrade storm water and sanitary sewer infrastructure in Harrisburg	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Harrisburg	Medium	The County Engineer will work with local drainage districts, IDOT, IDNR, U.S. Army Corps of Engineers to evaluate the current conditions of the county's waterways and drainage and develop a plan. County, state, and federal funding will be sought. Implementation will begin within three years.
Raise roads that are frequently inundated	Goal: Lessen impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the transportation abilities of emergency services throughout the county.	Flood	Countywide	Medium	The county engineer will work with local officials to determine at-risk roads. Funding will be sought from various sources.
Establish swing gates along frequently flooded county roads	Goal: Lessen the impacts from flooding to drivers in the community Objective: Minimize the effects of flooding along frequently inundated roads by restricting driver's access.	Flood	Countywide	High	The county engineer and local officials will create a plan for swing gate construction. Local and state funding resources will be sought.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Establish a database to identify special needs population	Goal: Lessen the impacts of hazards Objective: Improve emergency sheltering in the community	All Hazards	Countywide	Medium	The County EMA will work with the local Health Departments to establish a list of registered special needs persons.
Install repeaters for emergency radio frequencies	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county	All Hazards	Galatia	Low	
Develop training for potential hazardous materials spills and earthquakes; improve hazmat and earthquake response team capabilities	Goal: Develop long-term strategies to educate the public on the hazards affecting Crawford County Objective: Improve education of emergency personnel and public officials	HAZMAT and earthquakes	Countywide	Low	The County EMA will oversee the implementation of this project. Local resources will be used to evaluate the capabilities of a Hazmat Response Team and an Earthquake Response Team. The Pre-Disaster Mitigation program and Community development grants are a possible funding source. Implementation, if funding is available, is forecasted to be complete within approximately five years.
Structure screening for critical facilities earthquake damage (ATC21 survey)	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities and structures with structural design practices and equipment that will withstand natural disasters and offer weather-proofing	Earthquakes	Countywide	Complete	

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Stream and drainage ditch debris clearing and maintenance plan for Galatia	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards	Floods	Galatia	Low	The county engineer and flood managers will write grants for supporting persons to clean stream and drainage ditches which contribute significantly to flash flooding.
Stream and drainage ditch debris clearing and maintenance plan for Carrier Mills	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards	Floods	Carrier Mills	Medium	The county engineer and flood managers will write grants for supporting persons to clean stream and drainage ditches which contribute significantly to flash flooding. Carrier Mills is specifically interested in clearing ditches located at Gribble Drive and Deborann Drive.
Evaluate the need for stormwater retention ponds in Carrier Mills	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards	Floods	Carrier Mills	Low	The county and/or local engineer will seek funding for a hydrologic study to see if water retention ponds will solve some of the localized flooding problems.
Obtain cell phones for essential personnel	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication abilities of emergency services throughout the county	All Hazards	Countywide	Low	The County EMA will oversee the implementation of this project working closely with each jurisdiction to make sure communication lines are open during time of a disaster.
Conduct detailed flood studies	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies	Floods	Countywide	High	The County EMA will seek funding from various sources, including FEMA to obtain more information on flooding in Saline County. The Illinois State Water Survey is already working on the Saline River Watershed through FEMA's Risk Map.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Improve public education on the NFIP	Goal: Develop long-term strategies to educate Saline County residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation	Floods	Countywide	High	The County Floodplain Manager will work with other community leaders to educate the public about the benefit of the National Flood Insurance Program
Replace water lines from pump stations to Galatia	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	All Hazards	Galatia	High	The Galatia Water Department will work with the County to replace aged water and sewer lines to Galatia.
Generators to protect vaccines and storage of medical items at area hospital – Potential zone for backup power to provide for these areas	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	All Hazards	Countywide (EHD – Eldorado)	Medium	The EHD and other health departments in the County will work with the County EMA to apply for mitigation assistance.
Provide straps for water heaters/air conditioners, etc. for all structures	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	All Hazards	Countywide (Carrier Mills)	Medium	Carrier Mills will work with the County EMA to obtain funding to pass out these materials at public events.
Elevate roads, replace culverts and install permanent signage to warn of flash flooding along Tuller Road	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	All Hazards	Carrier Mills	High	Carrier Mills will work with the County EMA to obtain funding to pass out these materials at public events.
Replace existing and install new culverts in Eldorado	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	All Hazards	Eldorado	High	Carrier Mills will work with the County EMA to obtain funding to pass out these materials at public events.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Create a volunteer response team	Goal: Lessen the impacts of hazards to new and existing infrastructure **Objective**: Minimize the amount of infrastructure exposed to hazards.	All Hazards	Galatia Township	High	Galatia Township will work with the community to establish a response team to clean-up debris from roads after hazard events.

The Saline County Emergency Management Agency will be the local champions for the mitigation actions. The County Commissioners and the city and town councils will be an integral part of the implementation process. Federal and state assistance will be necessary for a number of the identified actions.

5.5 Multi-Jurisdictional Mitigation Strategy

As a part of the multi-hazard mitigation planning requirements, at least two identifiable mitigation action items have been addressed for each hazard listed in the risk assessment and for each jurisdiction covered under this plan.

Each of the six incorporated communities within and including Saline County was invited to participate in brainstorming sessions in which goals, objectives, and strategies were discussed and prioritized. Each participant in these sessions was armed with possible mitigation goals and strategies provided by FEMA, as well as information about mitigation projects discussed in neighboring communities and counties. All potential strategies and goals that arose through this process are included in this plan. The county planning team used FEMA's evaluation criteria to gauge the priority of all items. A final draft of the disaster mitigation plan was presented to all members to allow for final edits and approval of the priorities.

Section 6 Plan Maintenance

6.1 Monitoring, Evaluating, and Updating the Plan

Throughout the five-year planning cycle, the Saline County Emergency Management Agency (EMA) will reconvene the mitigation planning team to monitor, evaluate, and update the plan on an annual basis. Additionally, a meeting will be held during early 2017, to address the five-year update of this plan. Members of the planning committee are readily available to engage in email correspondence between annual meetings. If the need for a special meeting, due to new developments or a declared disaster occurs in the county, the team will meet to update mitigation strategies. Depending on grant opportunities and fiscal resources, mitigation projects may be implemented independently by individual communities or through local partnerships.

The committee will review the county goals and objectives to determine their relevance to changing situations in the county. In addition, state and federal policies will be reviewed to ensure they are addressing current and expected conditions. The committee will also review the risk assessment portion of the plan to determine if this information should be updated or modified. The parties responsible for the various implementation actions will report on the status of their projects, and will include which implementation processes worked well, any difficulties encountered, how coordination efforts are proceeding, and which strategies should be revised.

Updates or modifications to the MHMP during the five-year planning process will require a public notice and a meeting prior to submitting revisions to the individual jurisdictions for approval. The plan will be updated via written changes, submissions as the committee deems appropriate and necessary, and as approved by the county commissioners.

The GIS data used to prepare the plan was obtained from existing county GIS data as well as data collected as part of the planning process. This updated Hazus-MH GIS data has been returned to the county for use and maintenance in the county's system. As newer data becomes available, these updated data will be used for future risk assessments and vulnerability analyses.

6.2 Implementation through Existing Programs

The results of this plan will be incorporated into ongoing planning efforts since many of the mitigation projects identified as part of this planning process are ongoing. Saline County and its incorporated jurisdictions will update the zoning plans and ordinances listed in Table 5-2 as necessary and as part of regularly scheduled updates. Each community will be responsible for updating its own plans and ordinances.

6.3 Continued Public Involvement

Continued public involvement is critical to the successful implementation of the MHMP. Comments from the public on the MHMP will be received by the EMA Coordinator and forwarded to the mitigation planning team for discussion. Education efforts for hazard mitigation will be ongoing through the EMA. The public will be notified of periodic planning meetings through notices in the local newspaper. Once adopted, a copy of this plan will be maintained in each jurisdiction and in the county EMA Office.

Acronyms

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

A

AEGL – Acute Exposure Guideline Levels
ALOHA – Areal Locations of Hazardous Atmospheres

B

BFE – Base Flood Elevation

C

CAMEO – Computer-Aided Management of Emergency Operations
CEMA – County Emergency Management Agency
CEMP – Comprehensive Emergency Management Plan
CERI – Center for Earthquake Research and Information
CRS – Community Rating System

D

DEM – Digital Elevation Model
DFIRM – Digital Flood Insurance Rate Map
DMA – Disaster Mitigation Act of 2000

E

EAP – Emergency Action Plan
EMA – Emergency Management Agency
EPA – Environmental Protection Agency
ERPG – Emergency Response Planning Guidelines
ESDA – Emergency Services Disaster Agency

F

FEMA – Federal Emergency Management Agency
FIRM – Flood Insurance Rate Maps
FIS – Flood Information Study

G

GIS – Geographic Information System

H

Hazus-MH – Hazards USA Multi-Hazard
HUC – Hydrologic Unit Code

I

IDNR – Illinois Department of Natural Resources
IDOT - Illinois Department of Transportation
IEMA – Illinois Emergency Management Agency
IUPUI – Indiana University – Purdue University, Indianapolis

M

MHMP – Multi-Hazard Mitigation Plan
MOU – Memorandum of Understanding

N

NCDC – National Climatic Data Center
NEHRP – National Earthquake Hazards Reduction Program
NFIP – National Flood Insurance Program
NOAA – National Oceanic and Atmospheric Administration

P

PPM – Parts Per Million

R

RPI – Risk Priority Index

S

SIUC – Southern Illinois University - Carbondale
SPC – Storm Prediction Center
SWPPP – Storm water Pollution Prevention Plan

U

USGS – United States Geological Survey

Appendices

Appendix A. MHMP Meeting Minutes

IEMA Multi-Hazard Mitigation Plan

Assembly of the Saline County Planning Team Meeting 1:

Chairman: Allen Ninness

Plan Directors: SIUC Geology Department and IUPUI - Polis

Meeting Date: August 8, 2011
Meeting Time: 6:00 p.m.
Place: Southeastern Illinois College – Harrisburg, IL
Planning Team/Attendance: See Attached Sheet

Introduction to the Multi-Hazard Mitigation Planning Process

The meeting is called to order

Narrative: A power-point presentation was given by Jonathan Remo. He explained that this project is in response to the Disaster Mitigation Act of 2000. The project is funded by a grant awarded by FEMA. A twenty-five percent match will be required from the county to fund this project. The county match will be met by sweat equity and GIS data acquired from the County Assessor's Office. The sweat equity will be an accumulation of time spent at the meetings, on research assignments, surveys, along with the time spent reviewing and producing the planning document.

Jonathan Remo introduced the Pre-Disaster Mitigation Website to the planning team. A username and password was given to the planning team, which will grant them access to the web site. The web site is used to schedule meetings, post contact information and download material pertaining to the planning process.

Jonathan Remo divided the planning project into five to six meetings. At the 1st meeting, the planning team will review critical facility maps. The planning team will be asked to research and verify the location of all critical facilities within the county. Jonathan stated that public participation is very important throughout the planning process. He explained that all of the meetings are open to the public but there will be a particular effort made to invite the public to the 3rd meeting. At that meeting, the SIUC Geology Department will present historic accounts of natural disasters that have affected this area. At the 2nd meeting the discussion will focus on natural disasters that are relevant to this area. These hazards will be given a probability rating and ranked by their occurrence and potential level of risk. Polis and SIUC Geology will research these hazards and present them to the planning team. The 3rd meeting is publicized in order to encourage public participation. Polis and SIUC Geology will produce a risk assessment in draft form; each planning team member will get a copy. Also they will present strategies and projects that FEMA and other counties have undertaken for the planning team to review. The 4th meeting consists of a brain storming session focused on disasters that were analyzed in the risk assessment report. The Planning Team will list strategies and projects that could be implemented to mitigate the potential hazards that threaten the county. FEMA requires that for every identified hazard, a strategy to mitigate the loss and damage must be in place. The strategies may range from educational awareness to hardening a building or building a levee. After the 4th meeting the plan will be in its final draft form. At the 5th meeting the planning team will need to review the plan prior to sending it to IEMA. IEMA will review the plan and will make recommendation to it as they see fit, then it is submitted to FEMA for review and approval. Once the plan has been submitted to FEMA, local governments are eligible to apply for grants to mitigate these established hazards. After FEMA approves the plan, it is sent back to the Planning Team. At the 6th meeting the Planning Team will present the Pre-Disaster Mitigation Plan to the County Board for adoption. Incorporated communities must either adopt the county plan or prepare its own plan, in order to access mitigation assistance from FEMA. The communities are encouraged to participate and contribute to development of the plan. Once the County Board has adopted the plan, each incorporated community will have the opportunity to adopt the plan as well.

Jonathan Remo then introduced Beth Ellison of SIUC. Beth Ellison presented three maps that identified critical facilities in the county. She asked the planning team to come up to review the maps to identify any corrections that need to be made to the maps. She assigned research homework arranged by categories to individual planning team members to locate missing or incorrect critical facilities.

Meeting was adjourned.

Attendance Sheets Meeting 1

Saline County Meeting Attendance

Meeting 1 - Saline County

Please print clearly

Jurisdiction Name	Print Name	Initial	Job Title/Company	Contact Information (e-mail address and/or phone number)
Saline County EMA	Gayland Grant	GG	Communications Officer	u9ahw.gsl@gmail.com
IEMA	Ron Davis	RD	State [redacted] Hazard Mitigation Officer - IEMA	Ron.Davis@illinois.gov
Polis ~~John~~	John Buechler	JB	Polis Center	Jabuechl7 iupui.edu
Egyptian Health	Cindy Wise	CW	Egyptian Health	CWISE@EGYPTIAN.ORG
Egyptian Health	Jamie Byrd	JRB	Public Health Adm	jbyrd@egyptian.org
HMC	Keith Teal	KT	Director of Facility Services Harrisburg Medical Center	kteal@harrisburgmedicalcenter.org
Galatia Township	Mark E. Malone	MEM	Galatia Township Supervisor	mapmalone@yahoo.com
Galatia Township	Keith Mortag	KM	Galatia Township Clerk	KMORTAG@SIU.Edu
PND	Qiaoyun Yang	Y.Y.		
SIC	Debbie Hadfield	DH	Southeastern Ill. College	debbie.hadfield@sic.edu

Cass County Pre-Disaster Mitigation Plan Page 1

Saline County Meeting Attendance

Jurisdiction Name	Print Name	Initial	Job Title/Company	Contact Information (e-mail address and/or phone number)	
Saline County	Allan Ninness	AN	Director Saline County EMA	ema@salinecounty.illinois.gov	618 252-3732
Saline Co.	Brenda Funkhouse	bf	Library Director/EML	brendafunkhouse@gmail.com	618-926-0656
Saline County	Lisa Anderson	LA	Don Ferrell Hospital	landerson@ferrellhosp.org	618-273-3361 [illegible]
SALINE COUNTY	RON HOWARD	RH	STONEFORT VILLAGE TRUSTEE	RNRHOWARD@FRONTIER.COM	618-777-0184
SALINE COUNTY	Ron Fearheiley	RF	CITY OF HARRISBURG		618-841-6544
	Rick Mallady	RM	Harrisburg EMA	rickmallady@clearwave.com	618-841-2937
Saline County	Bill Summers	BS	Harrisburg Fire Chief	hbgfire@clearwave.com	618-841-2844

Cass County Pre-Disaster Mitigation Plan Page 2

IEMA Multi-Hazard Mitigation Plan

Assembly of the Saline County Planning Team Meeting 2:

Chairman: Allen Ninness

Plan Directors: SIUC Geology Department and IUPUI - Polis

Meeting Date: September 19, 2011
Meeting Time: 6:00 p.m.
Place: Southeastern Illinois College – Harrisburg, IL
Planning Team/Attendance: See Attached Sheet

Historical Hazards, their Probability, and Hazard Ranking

The meeting was called to order.

Beth Ellison began the meeting by re-introducing the objectives of the PDM Planning document. The planning document is mandated as a result of the "Disaster Mitigation Act of 2000". Beth stated that the objective of the meeting was to prioritize a list of disasters that are relevant to Saline County.

Beth Ellison provided the planning team with a handout to direct the focus of the meeting discussion. As Beth began to conduct the prioritizing process, she described the risk assessment ranking that FEMA has established.

Narrative: The Planning Team was then asked to assess and rank the hazards that could potentially befall Saline County using the risk priority index (RPI). The identified hazards were ranked as followed for Saline County:

#1: Thunderstorms
#2: Tornado
#3: Flooding
#4: Dam or Levee Failure
#5: Earthquakes
#6: Hazardous Materials Release
#7: Subsidence
#8: Excessive Heat/Drought
#9: Winter Storms
#10: Fire

Narrative: The planning team was then asked to analyze the historical weather events that have been plotted on a map of the county and communities therein. No corrections were noted by the planning team.

The planning team agreed to complete any missing information pertaining to critical facilities by the next meeting.

Meeting was adjourned.

Attendance Sheets Meeting 2

Saline County Meeting Attendance

Meeting 2 – September 19, 2011

Please print clearly

Jurisdiction Name	Print Name	Initial	Job Title/Company	Contact Information (e-mail address and/or phone number)	
Saline County EMA	Gayland Grant		Communications Officer	wgakw.qsc@gmail.com	
IEMA	Ron Davis		State Hazard Mitigation Officer, IEMA	Ron.davis@illinois.gov	
Polis Center	John Buechler		Polis Center	jobuechl@iupui.edu	
Egyptian Health	Cindy Wise	CW	Egyptian Health	Cwise@egyptian.org	
Egyptian health	Jamie Byrd		Public Health Administration	jbyrd@egyptian.org	
HMC	Keith Teal	KT	Director of Facility Services, Harrisburg Medical Center	kteal@harrisburgmedicalcenter.org	
Galatia Township	Mark E. Malone		Galatia Township, Supervisor	mapmalone@yahoo.com	
Galatia Township	Keith Mortag		Galatia Township Clerk	kmortag@siu.edu	
IND	Qiayum Yang				

Saline County Pre-Disaster Mitigation Plan Page 1

Saline County Meeting Attendance

Jurisdiction Name	Print Name	Initial	Job Title/Company	Contact Information (e-mail address and/or phone number)	
SIC	Debbie Hadfield		Southeastern Illinois College	Debbie.hadfield@sic.edu	
Saline County	Allan Ninness	ALN	Director Saline County EMA	ema@salinecounty.illinois.gov	618-252-3732
Saline County	Brenda Funkhouse		Library Director/EML	brendafunkhouse@gmail.com	618-926-0656
Saline County	Lisa Anderson		Don Ferrell Hospital	landerson@ferrellhouse.org	618-273-3311 ext. 172
Saline County	Ron Howard		Stonefort Village Trustee	rnrhoward@frontier.com	618-777-0184
Saline County	Ron Fearheihey		City of Harrisburg		618-841-6544
Saline County	Rick Mallady		Harrisburg EMA	rickmallady@clearwave.com	618-841-2937
Saline County	Bill Summers		Harrisburg Fire Chief	hbgfire@clearwave.com	618-841-2844
Regional Planning	Alene Carr		Economic Dev. Coordinator	acarr.sirpdc@clearwave.com	618-252-7463

Saline County Meeting Attendance

Meeting 2 – September 19, 2011

Please print clearly

Jurisdiction Name	Print Name	Initial	Job Title/Company	Contact Information (e-mail address and/or phone number)	
Saline County	Jacque Tripp	R	ER Nurse Supervisor	jtripp@ferrellhosp.org	273-3361 Ext 279
Saline Co. Hwy Dept.	Jeff Jones		County Engineer	schd1@frontier.com	6182534027
EHD	Bill WATSON	J	Environmental Egyptian Health Dept	bWatson@Egyptian.org	273-3326

IEMA Multi-Hazard Mitigation Plan

Assembly of the Saline County Planning Team Meeting 3:

Chairman: Allen Ninness

Plan Directors: SIUC Geology Department and IUPUI - Polis

Meeting Date: January 17, 2012
Meeting Time: 6:30 p.m.
Place: Southeastern Illinois College – Harrisburg, IL
Planning Team/Attendance: See Attached Sheet

Public Meeting and the County Risk Assessment

The meeting was called to order.

Jonathan Remo opened the meeting with an overview of the planning process and the roles of SIU and the Polis Center. Then he went on to explain the topics and objectives of the current meeting. Jonathan first presented the planning team with the list of hazards that the team had ranked by their level of risk from the previous meeting. He also presented a power point presentation of the history of Saline County's past disasters. This included covering each hazard that the County had focused on, the history of each and then the mitigation strategies. He defined mitigation as the act of avoidance and preparedness.

A draft of the Saline *C*ounty Mitigation Plan and a copy of Mitigation Ideas, produced by FEMA Region 5 in July 2002, were given to each of the planning team members for review. It was explained by Jonathan the contents of the booklet and that each of the planning team members should return to meeting 4 with three mitigation strategies for each of the hazards identified by the planning team.

Jonathan Remo then asked the audience for questions or comment. After some discussion about the plan and how it would affect the community and its residents, he thanked those who came and a closed the presentation.

Meeting was adjourned.

Attendance Sheets Meeting 3

Saline County Meeting Attendance

Meeting 3 – January 17, 2012

Please print clearly

Jurisdiction Name	Print Name	Initial	Job Title/Company	Contact Information (e-mail address and/or phone number)
Saline County EMA	Gayland Grant		Communications Officer	wgakw.qsc@gmail.com
IEMA	Ron Davis		State Hazard Mitigation Officer, IEMA	Ron.davis@illinois.gov
Polis Center	John Buechler		Polis Center	jobuech1@iupui.edu
Egyptian Health	Cindy Wise		Egyptian Health	Cwise@egyptian.org
Egyptian health	Jamie Byrd	JB	Public Health Administration	jbyrd@egyptian.org
HMC	Keith Teal		Director of Facility Services, Harrisburg Medical Center	kteal@harrisburgmedicalcenter.org
Galatia Township	Mark E. Malone	MEM	Galatia Township, Supervisor	mapmalone@yahoo.com
Galatia Township	Keith Mortag	KM	Galatia Township Clerk	kmortag@siu.edu
IND	Qiayun Yang	Q.Y.	Harrisburg, IL	124 Webster Street Harrisburg, IL 62946

Saline County Meeting Attendance

Jurisdiction Name	Print Name	Initial	Job Title/Company	Contact Information (e-mail address and/or phone number)	
SIC	Debbie Hadfield		Southeastern Illinois College	Debbie.hadfield@sic.edu	
Saline County	Allan Ninness	AN	Director Saline County EMA	ema@salinecounty.illinois.gov	618-252-3732
Saline County	Brenda Funkhouse		Library Director/EML	brendafunkhousef@gmail.com	618-926-0656
Saline County	Lisa Anderson	LA	Ferrell Hospital	landerson@ferrellhouse.org	618-273-3311 ext. 172
Saline County	Ron Howard		Stonefort Village Trustee	rnrhoward@frontier.com	618-777-0184
Saline County	Ron Fearheihey		City of Harrisburg		618-841-6544
Saline County	Rick Mallady	RM	Harrisburg EMA	rickmallady@clearwave.com	618-841-2937
Saline County	Bill Summers	BS	Harrisburg Fire Chief	hbgfire@clearwave.com	618-841-2844
Regional Planning	Alene Carr	AC	Economic Dev. Coordinator – SIPR&DC	acarr.sirpdc@clearwave.com	618-252-7463
Saline County	Jacque Tripp		ER Nurse Supervisor Ferrell Hospital	jtripp@ferrellhsop.org	618-273-3361

Saline County Meeting Attendance

Jurisdiction Name	Print Name	Initial	Job Title/Company	Contact Information (e-mail address and/or phone number)	
Saline County Hwy Dept.	Jeff Jones		County Engineer	schd1@frontier.com	618-252-4027
Eldorado Health Dept.	Bill Watson		Environmental Egyptian Health Dept.	bwatson@egyptian.org	618-273-3326
Brown + Roberts Inc	JIM W BROWN		ENGINEER	jwbbrri@yahoo.com	252-8111
IND	DARYL Hopkins			Eldorado, IL	841-3910
IND	Clinton Hopkins			Eldorado, IL	313-1961
Village of Carrier Mills	Rita Diefenbach		Village Clerk	rdiefenbach@nationwideglove.com	618-518-0326
Daily Register	Brian DeNeal		wr. reporter	bdeneal@yarcdearware.com	253-7146
Harrisburg Lib	Roy Gorman		[illegible]	[illegible]	253-7455
Hbg	Eric Gregg		Mayor	egregg06@yahoo.com	926-5063
HBG	Bobby Brown		SEWER/FLOOD DEPT HBG	HBGWWTP@YAHOO.com	926-0875
Rector Twp Eldorado/Saline Co	Mike Murray	MWM	Road Comm:	3485 Texas City Rd Eldorado IL	618 499-4640

Saline County Meeting Attendance

Jurisdiction Name	Print Name	Initial	Job Title/Company	Contact Information (e-mail address and/or phone number)	
City of Eldorado	Michael McKinnies		FireChief - ESDA	chief601@clearwave.com	618-273-3248

IEMA Multi-Hazard Mitigation Plan

Assembly of the Saline County Planning Team Meeting 4:

Chairman: Allan Ninness

Plan Directors: SIUC Geology Department and IUPUI – Polis

Meeting Date: February 21, 2012
Meeting Time: 6:30 p.m.
Place: Southeastern Illinois College – Harrisburg, IL
Planning Team/Attendance: See Attached Sheet

Determining Hazard Mitigation Strategies

The meeting was called to order.

Beth Ellison thanked everyone for attending the meeting and stated that if the planning team members needed extra mitigation strategy handbooks that they were available upon request.

Beth Ellison began by explaining that today's meeting would cover mitigation strategies that the planning team believed would prevent or eliminate the loss of life and property. She explained that the planning team should not make any reservations in the form of money or resources when developing this list. Also whenever possible, the planning team was directed to be specific about the location or focus area of a strategy, in respect to being within a municipality or county wide. Each hazard was addressed one at a time. The planning team listed new and current on-going mitigation strategies in respect to each hazard. The planning team prioritized mitigation actions based on a number of factors. A rating of High, Medium, or Low was assessed for each mitigation item. Listed below are the New Mitigation Strategies that the Planning Team came up with:

- Enforce tie-down ordinance for mobile homes
- Purchase generators and/or transfer switches to provide back-up power to critical facilities, community shelters, and pump stations
- Harden critical facilities, such as fire stations, police stations, and city municipal buildings
- Construct and/or improve storm shelters in mobile home parks
- Public education on the benefits of weather radios, warning sirens, and emergency kits
- Encourage buried power lines
- Establish a warming center in Carrier Mills
- Develop a debris management plan and identify storage sites
- Construct a new Emergency Operations Center
- Establish a water distribution system
- Install inertial valves at critical facilities
- Upgrade storm water and sanitary sewer infrastructure in Harrisburg

- Raise roads that are frequently inundated
- Develop training for potential hazardous materials spills and earthquakes; improve hazmat and earthquake response team capabilities
- Stream and drainage ditch debris clearing and maintenance plan for Galatia
- Evaluate the need for storm water retention ponds in Carrier Mills

Attendance Sheets Meeting 4

Saline County Meeting Attendance

Meeting 4 –February 21, 2012

Please print clearly

Jurisdiction Name	Print Name	Initial	Job Title/Company	Contact Information (e-mail address and/or phone number)	
Saline County EMA	Gayland Grant		Communications Officer	w9akw.qsl@gmail.com	
IEMA	Ron Davis		State Hazard Mitigation Officer, IEMA	Ron.davis@illinois.gov	
Polis Center	John Buechler	[illegible]	Polis Center	jobuechl@iupui.edu	
Egyptian Health	Cindy Wise	[illegible]	Egyptian Health	cwise@egyptian.org	
Egyptian health	Jamie Byrd		Public Health Administration	jbyrd@egyptian.org	
HMC	Keith Teal		Director of Facility Services, Harrisburg Medical Center	kteal@harrisburgmedicalcenter.org	
Galatia Township	Mark E. Malone	MEM	Galatia Township, Supervisor	mapmalone@yahoo.com	
Galatia Township	Keith Mortag		Galatia Township Clerk	kmortag@siu.edu	
IND	Qiayun Yang	Q.Y.		124 S. Webster Street Harrisburg, IL 62946	

Saline County Meeting Attendance

Jurisdiction Name	Print Name	Initial	Job Title/Company	Contact Information (e-mail address and/or phone number)	
SIC	Debbie Hadfield		Southeastern Illinois College	Debbie.hadfield@sic.edu	
Saline County	Allan Ninness	ALN	Director Saline County EMA	ema@salinecounty.illinois.gov	618-252-3732
Saline County	Brenda Funkhouser	bf.	Library Director/EML	brendafunkhouser@gmail.com	618-926-0656
Saline County	Lisa Anderson		Ferrell Hospital	landerson@ferrellhouse.org	618-273-3311 ext. 172
Saline County	Ron Howard		Stonefort Village Trustee	rnrhoward@frontier.com	618-777-0184
Saline County	Ron Fearheihey	RF	City of Harrisburg		618-841-6544
Saline County	Rick Mallady	RM	Harrisburg EMA	rickmallady@clearwave.com	618-841-2937
Saline County	Bill Summers	BS	Harrisburg Fire Chief	hbgfire@clearwave.com	618-841-2844
Regional Planning	Alene Carr	AC	Economic Dev. Coordinator – SIPR&DC	acarr.sirpdc@clearwave.com	618-252-7463
Saline County	Jacque Tripp		ER Nurse Supervisor Ferrell Hospital	jtripp@ferrellhsop.org	618-273-3361

Saline County Meeting Attendance

Jurisdiction Name	Print Name	Initial	Job Title/Company	Contact Information (e-mail address and/or phone number)	
Saline County Hwy Dept.	Jeff Jones		County Engineer	schd1@frontier.com	618-252-4027
Eldorado Health Dept.	Bill Watson		Environmental Egyptian Health Dept.	bwatson@egyptian.org	618-273-3326
Brown & Roberts	Jim W. Brown		Engineer	jwbbrri@yahoo.com	618-252-8111
IND	Daryl Hopkins			Eldorado, IL	618-841-3910
IND	Clinton Hopkins			Eldorado, IL	618-313-1961
Village of Carrier Mills	Rita Diefenbach		Village Clerk	rdiefenbach@nationwideglove.com	618-518-0326
Daily Register	Brian Deneal		Writer	bdeneal@yourclearwave.com	618-253-7146
Harrisburg Library	Ray Gorman		Literacy Outreach Coordinator	namrog1@peoplepc.com	618-253-7455
City of Harrisburg	Eric Gregg		Mayor	Egregg06@yahoo.com	618-926-5063
City of Harrisburg	Bobby Brown		Sewer/Flood Dept.	hbgwwtp@yahoo.com	618-926-0875
Rector Township/Eld	Mike Murray		Road Commissioner	3485 Texas City Road Eldorado, IL 62930	618-499-4640

Saline County Meeting Attendance

Jurisdiction Name	Print Name	Initial	Job Title/Company	Contact Information (e-mail address and/or phone number)	
Saline County Hwy Dept.	Jeff Jones		County Engineer	schd1@frontier.com	618-252-4027
Eldorado Health Dept.	Bill Watson		Environmental Egyptian Health Dept.	bwatson@egyptian.org	618-273-3326
Brown & Roberts	Jim W. Brown		Engineer	jwbbrri@yahoo.com	618-252-8111
IND	Daryl Hopkins			Eldorado, IL	618-841-3910
IND	Clinton Hopkins			Eldorado, IL	618-313-1961
Village of Carrier Mills	Rita Diefenbach	R.D.	Village Clerk	rdiefenbach@nationwideglove.com	618-518-0326
Daily Register	Brian Deneal	BD	Writer	bdeneal@yourclearwave.com	618-253-7146
Harrisburg Library	Ray Gorman		Literacy Outreach Coordinator	namrog1@peoplepc.com	618-253-7455
City of Harrisburg	Eric Gregg		Mayor	Egregg06@yahoo.com	618-926-5063
City of Harrisburg	Bobby Brown	BB	Sewer/Flood Dept.	hbgwwtp@yahoo.com	618-926-0875
Rector Township/Eld	Mike Murray		Road Commissioner	3485 Texas City Road Eldorado, IL 62930	618-499-4640

IEMA Multi-Hazard Mitigation Plan

Assembly of the Saline **County Planning Team Meeting 5:**

Chairman: Alene Carr, SIRP&DC

Plan Directors: SIUC Geology Department and IUPUI – Polis

Meeting Date: Tuesday, June 12, 2012

Meeting Time: 6:30 p.m.

Place: Saline County EMA Offices

Planning Team/Attendance: See Attached Sheet

The plan was distributed to all attendees.

County Plan Correction and Comments: attendees will take plan and review for completeness and send any corrections to Alene Carr at SIRP&DC. Ms. Carr will send the corrections to SIU for inclusion in the plan.

Attendance Sheets Meeting 5

Saline County Meeting Attendance

Meeting 5 –June 12, 2012

Please print clearly

Jurisdiction Name	Print Name	Initials	Job Title/Company	Contact Information (e-mail address and/or phone number)	
Saline County EMA	Gayland Grant		Communications Officer	w9akw.qsl@gmail.com	
IEMA	Ron Davis		State Hazard Mitigation Officer, IEMA	Ron.davis@illinois.gov	
Polis Center	John Buechler		Polis Center	jobuechl@iupui.edu	
Egyptian Health	Cindy Wise	CW	Egyptian Health	cwise@egyptian.org	
Egyptian health	Jamie Byrd		Public Health Administration	jbyrd@egyptian.org	
HMC	Keith Teal	KT	Director of Facility Services, Harrisburg Medical Center	kteal@harrisburgmedicalcenter.org	
Galatia Township	Mark E. Malone		Galatia Township, Supervisor	mapmalone@yahoo.com	
Galatia Township	Keith Mortag		Galatia Township Clerk	kmortag@siu.edu	
IND	Qiayun Yang			124 S. Webster Street Harrisburg, IL 62946	

Saline County Meeting Attendance

Jurisdiction Name	Print Name	Initial	Job Title/Company	Contact Information (e-mail address and/or phone number)	
SIC	Debbie Hadfield		Southeastern Illinois College	Debbie.hadfield@sic.edu	
Saline County	Allan Ninness	AN	Director Saline County EMA	ema@salinecounty.illinois.gov	618-252-3732
Saline County	Brenda Funkhouser	BF	Library Director/EML	brendafunkhouser@gmail.com	618-926-0656
Saline County	Lisa Anderson	LA	Ferrell Hospital	landerson@ferrellhouse.org	618-273-3311 ext. 172
Saline County	Ron Howard		Stonefort Village Trustee	rnrhoward@frontier.com	618-777-0184
Saline County	Ron Fearheihey		City of Harrisburg		618-841-6544
Saline County	Rick Mallady		Harrisburg EMA	rickmallady@clearwave.com	618-841-2937
Saline County	Bill Summers		Harrisburg Fire Chief	hbgfire@clearwave.com	618-841-2844
Regional Planning	Alene Carr	AC	Economic Dev. Coordinator – SIPR&DC	acarr.sirpdc@clearwave.com	618-252-7463
Saline County	Jacque Tripp		ER Nurse Supervisor Ferrell Hospital	jtripp@ferrellhsop.org	618-273-3361

Saline County Meeting Attendance

Jurisdiction Name	Print Name	Initial	Job Title/Company	Contact Information (e-mail address and/or phone number)	
Saline County Hwy Dept.	Jeff Jones		County Engineer	schd1@frontier.com	618-252-4027
Eldorado Health Dept.	Bill Watson		Environmental Egyptian Health Dept.	bwatson@egyptian.org	618-273-3326
Brown & Roberts	Jim W. Brown		Engineer	jwbbrri@yahoo.com	618-252-8111
IND	Daryl Hopkins			Eldorado, IL	618-841-3910
IND	Clinton Hopkins			Eldorado, IL	618-313-1961
Village of Carrier Mills	Rita Diefenbach	RD	Village Clerk	rdiefenbach@nationwideglove.com	618-518-0326
Daily Register	Brian Deneal		Writer	bdeneal@yourclearwave.com	618-253-7146
Harrisburg Library	Ray Gorman		Literacy Outreach Coordinator	namrog1@peoplepc.com	618-253-7455
City of Harrisburg	Eric Gregg		Mayor	Egregg06@yahoo.com	618-926-5063
City of Harrisburg	Bobby Brown		Sewer/Flood Dept.	hbgwwtp@yahoo.com	618-926-0875
Rector Township/Eld	Mike Murray		Road Commissioner	3485 Texas City Road Eldorado, IL 62930	618-499-4640

Saline County Meeting Attendance

Jurisdiction Name	Print Name	Initial	Job Title/Company	Contact Information (e-mail address and/or phone number)	
City of Eldorado	Michael McKinnies		Fire Chief / ESDA	Chief601@clearwave.com	618-273-3248
Eld Health Dept	Kari Jo Lane	KJL	Environmental Health Practitioner	klane@egyptian.org	618-273-3326
	Jon Reno	[illegible]	SIU		
	William T Kane	WTK.	SCEMA	Photographer & Documentation	618-273-3609

Appendix B. Local Newspaper Articles

Disaster planning to be Tuesday topic

CHRISTY STEWART
STAFF WRITER

SALINE COUNTY

The Saline County Multi-Hazard Mitigation Steering Committee will host a public information and strategy planning session at 6:30 p.m. Tuesday at Southeastern Illinois College.

Through a grant, the Saline County Emergency Management Agency formed an alliance with Southern Illinois University-Carbondale and the Polis Center of Indiana University-Purdue University Indianapolis to identify potential natural hazards and to produce a mitigation plan for each disaster that could eventually happen.

The intention of the study has been to develop a plan to identify potential natural hazards for Saline County and then establish mitigation measures that are intended to reduce or eliminate the effect a particular hazard could have on the county, according to a prepared release of local emergency managers.

According to the announcement, over the past several months the planning team has worked with staff from SIU-C to develop a "Multi-Hazard Mitigation Plan" for the county to submit to the Federal Emergency Management Agency for approval.

According to a prepared release from the county's emergency management agency, FEMA now requires each unit of government in the to have a FEMA-approved plan to handle disasters, so completion of the Saline County plan has been a critical matter.

The plan, according to the prepared release, will serve as a framework for developing projects that will reduce the effect of future disasters on both communities and unincorporated areas of the county.

According to the prepared release, examples of projects that have been completed by some communities include storm shelters, warning sirens, flood walls and added fire protection.

According to the release, the group has identified several potential hazards for the area, including earthquake, flood, fire, tornado and other natural disasters. The planning team then selected hazards for SIU-C to model with the intent of predicting the probable impact on the county's communities of various disasters in terms of financial, human life and safety.

Once the plan is completed, it will be submitted to FEMA for approval.

The planning team will also work to find the funding for any mitigation activities that are identified.

Appendix C. Adopting Resolutions

Resolution #_____________

ADOPTING THE SALINE COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, Saline County recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHEREAS, Saline County participated jointly in the planning process with the other local units of government within the County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that Saline County hereby adopts the Saline County Multi-Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED that The Saline County Emergency Management Agency will submit on behalf of the participating municipalities the adopted Multi-Hazard Mitigation Plan to the Illinois Department of Homeland Security and the Federal Emergency Management Agency for final review and approval.

ADOPTED THIS ______________ Day of _________________, 2012.

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Village President

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Village Council Member

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Village Council Member

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Village Council Member

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Village Council Member

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Attested by: Village Clerk

Resolution #_____________

ADOPTING THE SALINE COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, City of Harrisburg recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHEREAS, the City of Harrisburg participated jointly in the planning process with the other local units of government within the County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that the City of Harrisburg hereby adopts the Saline County Multi-Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED that The Saline County Emergency Management Agency will submit on behalf of the participating municipalities the adopted Multi-Hazard Mitigation Plan to the Illinois Department of Homeland Security and the Federal Emergency Management Agency for final review and approval.

ADOPTED THIS ____________ Day of ________________, 2012.

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Village President

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Village Council Member

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Village Council Member

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Village Council Member

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Village Council Member

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Attested by: Village Clerk

Resolution #_____________

ADOPTING THE SALINE COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, City of Eldorado recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHEREAS, the City of Eldorado participated jointly in the planning process with the other local units of government within the County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that the City of Eldorado hereby adopts the Saline County Multi-Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED that The Saline County Emergency Management Agency will submit on behalf of the participating municipalities the adopted Multi-Hazard Mitigation Plan to the Illinois Department of Homeland Security and the Federal Emergency Management Agency for final review and approval.

ADOPTED THIS _____________ Day of _________________, 2012.

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Village President

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Village Council Member

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Village Council Member

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Village Council Member

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Village Council Member

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Attested by: Village Clerk

Resolution #_____________

ADOPTING THE SALINE COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, Village of Galatia recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHEREAS, the Village of Galatia participated jointly in the planning process with the other local units of government within the County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that the Village of Galatia hereby adopts the Saline County Multi-Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED that The Saline County Emergency Management Agency will submit on behalf of the participating municipalities the adopted Multi-Hazard Mitigation Plan to the Illinois Department of Homeland Security and the Federal Emergency Management Agency for final review and approval.

ADOPTED THIS ______________ Day of __________________, 2012.

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Village President

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Village Council Member

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Village Council Member

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Village Council Member

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Village Council Member

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Attested by: Village Clerk

Resolution #_____________

ADOPTING THE SALINE COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, Village of Carrier Mills recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHEREAS, the Village of Carrier Mills participated jointly in the planning process with the other local units of government within the County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that the Village of Carrier Mills hereby adopts the Saline County Multi-Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED that The Saline County Emergency Management Agency will submit on behalf of the participating municipalities the adopted Multi-Hazard Mitigation Plan to the Illinois Department of Homeland Security and the Federal Emergency Management Agency for final review and approval.

ADOPTED THIS ______________ Day of _________________, 2012.

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Village President

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Village Council Member

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Village Council Member

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Village Council Member

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Village Council Member

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Attested by: Village Clerk

Resolution #_____________

ADOPTING THE SALINE COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, Village of Raleigh recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHEREAS, the Village of Raleigh participated jointly in the planning process with the other local units of government within the County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that the Village of Raleigh hereby adopts the Saline County Multi-Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED that The Saline County Emergency Management Agency will submit on behalf of the participating municipalities the adopted Multi-Hazard Mitigation Plan to the Illinois Department of Homeland Security and the Federal Emergency Management Agency for final review and approval.

ADOPTED THIS ______________ Day of __________________, 2012.

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Village President

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Village Council Member

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Village Council Member

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Village Council Member

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Village Council Member

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Attested by: Village Clerk

Resolution #_____________

ADOPTING THE SALINE COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, Village of Muddy recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHEREAS, the Village of Muddy participated jointly in the planning process with the other local units of government within the County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that the Village of Muddy hereby adopts the Saline County Multi-Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED that The Saline County Emergency Management Agency will submit on behalf of the participating municipalities the adopted Multi-Hazard Mitigation Plan to the Illinois Department of Homeland Security and the Federal Emergency Management Agency for final review and approval.

ADOPTED THIS ______________ Day of _________________, 2012.

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Village President

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Village Council Member

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Village Council Member

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Village Council Member

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Village Council Member

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Attested by: Village Clerk

Appendix D. Historical Hazards Map

-See Attached Large-Format Maps

Appendix E. List of Critical Facilities

Airport Facilities Report

FacilityName	Address	City	AnalysisClass	PrimaryFunction	Replacement
HARRISBURG-RALEIGH		HARRISBURG	ADFLT	PUBLIC	10651

Bus Facilities Report

FacilityName	Address	City	AnalysisClass	PrimaryFunction	Replacement
Rides Mass Transit	1200 W Poplar St	Harrisburg	BDFLT	PUBLIC	1209.9

Waste Water Facilities Report

FacilityName	Address	City	ReplacementCost
CARRIER MILLS STP	SOUTH OF RT. 45 ON TELLER	CARRIER MILLS	73926
ELDORADO STP	U.S. ROUTE 45 WEST	ELDORADO	73926
GALATIA STP	UTILITY STREET	GALATIA	73926
HARRISBURG SEWAGE	EAST WALNUT STREET	HARRISBURG	73926
MUDDY STP	P.O. BOX 8	MUDDY	73926
STONEFORT STP	VILLAGE HALL	STONEFORT	73926

Dams Report

FacilityName	NameofRiver	NearestCitytoDam	LengthofDamft	PurposeoftheDam
NEW HARRISBURG	TRIB MIDDLE FORK SALINE	GALATIA-OFFSTREAM	1000	SO
GLEN JONES LAKE	HORSESHOE CREEK	EQUALITY	1275	RS
ELDORADO	TRIB WOLF CREEK	MUDDY	1200	S
AMERICAN	TRIB MIDDLE FORK SALINE	AKIN	12000	O
WESTERN FUELS	TRIB BRUSHY CREEK	NEW HOPE	5000	O
AMERICAN	TRIB MIDDLE FORK SALINE	GALATIA	8900	O
WESTERN FUELS	TRIB BRUSHY CREEK	NEW HOPE	5900	O
WESTERN FUELS	TRIB BRUSHY CREEK	NEW HOPE	1350	O
WESTERN FUELS	TRIB BRUSHY CREEK	NEW HOPE	821	O
HARRISBURG	MIDDLE FORK SALINE	MUDDY	8400	S
POTTERS POND	TRIB MIDDLE FORK SALINE	MUDDY	650	R
WESTERN	TRIB BRUSHY CREEK	NONE	5400	O
AMERICAN	MIDDLE FORK SALINE RIVER	GALATIA	3200	O
HARRISBURG	TRIB PANKEY BRANCH			
WESTERN	NONE			
ARCLAR/WILLOW	TRIB COCKEREL BRANCH			

EOC Facilities Report

FacilityName	Address	City	FacilityC	ReplacementCostthous
Harrisburg Emergency Svc	110 E Locust St # 1	Harrisburg	EFEO	1110

Fire Station Facilities Report

FacilityName	Address	City	Facilit	Replacementcostthous
Harrisburg Fire Dept	100 S Main St	Harrisburg	EFFS	1613
Eldorado Fire Dept	1015 1st St	Eldorado	EFFS	1613
Carrier Mills Fire Dept	101 N Mill St.	Carrier Mills	EFFS	666
Galatia Fire Dept	305 W MIll St.	Galatia	EFFS	1613

Police Station Facilities Report

FacilityName	Address	City	FacilityC	ReplacementCostthous
Saline County Sheriff's Office	1 N Main St #1	Harrisburg	EFPS	1613
Carrier Mills Police Dept	101 N MILL ST	Carrier Mills	EFPS	1613
Eldorado Police Dept	921 Veterans Dr	Eldorado	EFPS	1554
Harrisburg police Dept	1 N Main St. #2	Harrisburg	EFPS	1613

Medical Care Facilities Report

FacilityName	Address	City	Facilit	NumberofBeds	ReplacementCostThous
HARRISBURG MEDICAL	100 DOCTOR WARREN	HARRISBURG	EFHM	80	20985
FERRELL HOSPITAL	1201 PINE ST	ELDORADO	EFHM	51	133778
SALINE CARE CENTER	120 SOUTH LAND ST	HARRISBURG		142	
CARRIER MILLS NURSING	6789 US 45 SOUTH	CARRIER MILLS		99	
MAGNOLIA MANOR	1100 GRANT STREET	ELDORADO		44	
FOUNTAIN VIEW NURSING	1001-A JEFFERSON ST	ELDORADO		125	
BROOKE HILL RES	2207 UPCHURCH ST	ELDORADO		16	
HARRISBURG CARE CNTR	1000 WEST SLOAN ST	HARRISBURG		68	
TURNER MANOR INC.	901 OGELSBY ST	HARRISBURG		35	
BROOKSTONES ESTATES	165 RON MORSE DR	HARRISBURG		46 Apartments	
SOUTHEASTERN RES	914 S WASHINGTON	HARRISBURG		18	
GOOD SHEPARD NURSING	400 S MAIN CROSS	GALATIA		73	

Communication Facilities Report

FacilityName	Address	City	AnalysisClass	PrimaryFunction	ReplacementCostThous
WEBQ 1240		HARRISBURG	CBR	AM 111	
WEBQ-FM CH 272		ELDORADO	CBR	FM 111	

School Facilities Report

FacilityName	Address	City	Facilit	NumberofStudents	ReplacementCost
ELDORADO ELEM SCH	1100 ALEXANDER ST	ELDORADO	EFS1	645	555
ELDORADO HIGH SCH	2200 ILLINOIS AVE	ELDORADO	EFS1	373	555
ELDORADO MIDDLE SCH	1907 1ST ST	ELDORADO	EFS1	276	555
GALATIA GRADE SCH	200 N HICKORY ST.	GALATIA	EFS1	51	555
GALATIA HIGH SCH	200 N MCKINLEY ST	GALATIA	EFS1	122	555
HARRISBURG HIGH SCH	333 W COLLEGE ST	HARRISBURG	EFS1	598	555
HARRISBURG MIDDLE SCH	312 BULLDOG BLVD.	HARRISBURG	EFS1	341	7954
EAST SIDE INTERMEDIATE	315 E CHURCH ST	HARRISBURG	EFS1	684	555
WEST SIDE PRIMARY SCH	411 W LINCOLN ST	HARRISBURG	EFS1	689	555
CARRIER MILLS-ST FT	2213 W FURLONG ST.	CARRIER MILLS	EFS1		555
CARRIER MILLS-ST FT	7071 US 45 S	CARRIER MILLS	EFS1		555
SOUTHEASTERN IL	3575 COLLEGE ROAD	HARRISBURG	EFS2		7954
ELDORADO CHRISTIAN	2321 ILLINOIS AVENUE	ELDORADO	EFS1		555

Appendix F. Critical Facilities Map

-See Attached Large-Format Map